SANKHYĀ

THE INDIAN JOURNAL OF STATISTICS

SANKHYĀ, Vol. 15, Parts 1 & 2, 1955

CONTENTS

(All rights reserved)

PROCEEDINGS OF THE
INTERNATIONAL STATISTICAL CONFERENCES
INDIA, 1951

The Proceedings of the International Statistical Conferences held in India in December, 1951 have been published. Four parts of the Proceedings are available at present. One part is going through the Press and may be available before long.

The publications contain papers by eminent statisticians and would be of great value to individuals, institutions and libraries who are interested in Statistics and allied subjects.

The subjects dealt with in the different parts are as follows :

Part I : Introductory (in press). Price : $ 1.25.

Part II : MATHEMATICAL STATISTICS AND BIOMETRY. This part contains papers on Theory of Statistics including Sampling, and also the papers presented at the International Biometric Symposium on Biometric problems in the prediction and estimation of the growth of plants in tropical and subtropical regions. 404 Pages; Price : $ 7.50.

Part III : INCOME AND WEALTH, ECONOMETRICS AND ECONOMIC STATISTICS. This part contains papers on National Income and Social Accounting Procedures particularly in underdeveloped economies, and also papers on Demand Analysis and Financial Statistics. 350 Pages; Price : $ 5.25.

Part IV : DEMOGRAPHY AND LABOUR STATISTICS. This part contains papers on Fertility and Mortality rates and on particular aspects of Population Censuses, and also papers on the development and organization of Labour Statistics. 280 Pages; Price : $ 5.00.

Part V : INDUSTRIAL STATISTICS, AGRICULTURAL STATISTICS, EDUCATIONAL AND CULTURAL STATISTICS. This part contains papers on the Industrial Applications of Statistics in various countries, and also papers on Systems of Agricultural Statistics and Educational and Cultural Statistics. Papers on National Statistical Systems and Statistical Education are also included in this part. 393 Pages ; Price : $ 5.00.

The price of all the five parts taken together will be $ 20.00.

Orders should be sent to

The Secretary,
STATISTICAL PUBLISHING SOCIETY

204/1 Barrackpore Trunk Road
Calcutta 35, India.

CONTENTS OF VOLUME 26, NO. 1, MARCH, 1955

BIOMETRIKA

Vol. 41

CONTENTS

Parts 3 and 4

MISCELLANEA
REVIEW

MARKET PRICE VERSUS FACTOR COST IN NATIONAL INCOME STATISTICS

By RAGNAR FRISCH

University Institute of Economics, Oslo

Much has been said in national income literature on the use of "market price" as distinguished from "factor cost" to measure national income. If the problem were only an academic one, we need not pay much attention to it. But in reality it goes much deeper. To put it briefly : If we cut through all phraseology, I think the practice of measuring national income at factor cost is a heritage from the time when only the things done by free enterprise were considered *the real things* and Government and all its doings were considered more or less a nuisance. It is high time that at least those countries where this philosophy has lost its foothold, stop using national income at factor cost as a relevant concept. I shall try to give my reasons for thinking so.

To avoid misunderstanding let me first state certain things against which my criticism is *not* directed.

(1) I have, of course, no objection against the idea that the *unit of measurement* of the various items in the national accounts (or the national budget) may be chosen differently. All values may, for instance, be measured in dollars or in pound sterlings etc. Or one may use *deflated* values in stead of current values. The choice depends essentially on the purpose of the analysis and on the kind of data available.

(2) Nor have I any objection against the idea that the values that enter into the national income, be decomposed into *categories* in some way or another, and a comparison made to find out how large a part *one* specific of these categories or a given *combination* of these categories make up. This idea may be applied to any division

1

of the values into categories whether the criterion on which the division is performed be "cost" or any other principle. If a well-defined principle of division of values into categories is accepted, and one wants to find out what the amount of any given category is, not only in the national total, but in the corresponding values that emerge in *individual sectors* or *individual products*, then it is necessary to proceed by means of a system of simultaneous linear equations, equal in number to the number of individual sectors or products. Indeed, if several sectors or products are considered, account must be taken of the fact that one sector delivers goods and services to others, and these in turn deliver goods and services to still others. Similar reasoning for a subdivision into products. This decomposition problem is well known to any national income analyst who has approached the problem from the viewpoint of input-output analysis.

For specific purposes of *economic policy* such computations may be quite significant. For instance, how much labour enters into a given kind of product if one takes account not only of the direct use of labour on this product, but also takes account of the indirect use through raw materials etc. ? Or how large a part of the services needed for the production of a given kind of goods is furnished by government, and how large a part by private enterprises ? Or how large a part of these services are paid for by means of cheques and credit instruments, and how large a part is paid for in cash ? Or how much of these services are contained in the price of the product as actually paid in the market, and how much is covered by the government budget ? There is no end to the type of questions of this sort that may be raised. If the division into categories of values is well-defined and a suitable technique for solving the linear equations (or inverting the matrix) is applied, questions of this sort may be answered.

The question of the measuring rod as defined under (1) above is logically *entirely different* from the question of dividing the value items into categories. For any category any of the measuring rods may be used. Some people who use the concept of "factor cost" are perhaps thinking of some sort of special measuring rod. But if they do, the difference between net national product at factor cost and net national product at market price would *disappear* when a deflation is performed. Others may perhaps—more or less unconsciously—think of the concept of factor cost as descriptive of only a part of national income. These ways of thinking and talking are unclear, but after all rather harmless.

Frequently, however, the concept of factor cost is used in a way *which implies much more than this*, and it is against these more far-reaching implications that my objections are directed.

These far-reaching implications are well exemplified in many published works. One of them can serve just as well as another. In one of them it is said : "It would be quite possible, however, to value either an individual firm's output or the total national output at what it *costs* in terms of the factors of production used, rather than

at what it brings on the market. Such a valuation in terms of factor cost would be more closely related to the utilization of resources in the economy." ... "Tobacco products are heavily taxed, and the manufacturers (in the U.S.) paid over $1.5 billion in Federal and State excise taxes alone."

Here a number of questions immediately present themselves: What is meant by a factor of production ? What is meant by "utilization of resources ?" Which resources ? Utilization for what purpose ? By what sort of criteria or what sort of reasoning can one reach the conclusion that the $1.5 billion is *not* to be considered as paid to the "factors of production" for the total national output ?

There is no other way to give final, meaningful and consistent answers to such questions than by building up the whole system of concepts axiomatically. One of the first things one has to decide upon and state explicitly would then be whether the system of concepts one wishes to use is to be such that "factors of production" mean all humanly controllable things that contribute to the creation of the national product.

If the decision is affirmative, a difference between the concept of net national product at factor cost and at market price can emerge only if one is prepared to maintain that the "factors" do not receive what they have actually produced. There must, then exist some "leisure class" that appropriates part of the national product. It may be some private "leisure class" (in other words some sort of Marxian theory) or it may be Government.

On the other hand, if one wishes to define the system of concepts in such a way that "factors" do *not* include all the humanly controllable things that contribute to the product, one would either be left with an "unexplained part" of national product or one would have to consider two sorts of things that both contribute to the creation of the national product, and both are remunerated and explained, but have nevertheless for some reason or other received different names, one being called "factors" and the other not being called so. In this case it would be quite inappropriate to call net national product at factor cost "national income". It should then be called "that part of national income which goes to those creative elements which I have chosen to term factors". A very explicit statement would then, of course, be needed to explain *why* the creative elements that are selected in this way and termed "factors" are "more closely related to the utilization of resources in the economy" than the other creative elements.

These are the alternatives available for interpreting the meaning of "factor cost" as distinguished from "market price". One has to choose one of these alternatives *and take the consequences*. From the viewpoint of formal logic any of the solutions are, of course, permissible, but an unconditional requirement is that in any case, the solution chosen be clearly described, the premises precisely stated, and a terminology used that does not lead the reader astray. I have a strong feeling that this requirement is not fulfilled in the current literature on "factor cost" and "market price". In particular, the required explanation is certainly not given in the exposition quoted.

I rather suspect that the author had in mind the last of the above alternatives, and that his distinction between those creative elements which he wished to term "factors" and those he did not wish to honour by this name, is drawn according to *the form in which the element in question receives its remuneration*, all creative elements being called "factors" except those that receive their remuneration through the special part of the government budget that has to do with indirect taxes and subsidies and similar items.

If this is the logic at the back of the "factor cost" concept it would be more correct to term the concept *the privately earned part of national income*. Whatever the terminology adopted, if the logic is as here suggested, we are very much in need of an explanation why this particular income concept—the privately earned part of national income—is more realistic, "more closely related to the utilization of resources", than other national income concepts.

To me this whole problem appears in a different light. I think that *whichever* of the above-mentioned logical possibilities one chooses for interpreting the meaning of "factor cost", this concept will not be a fundamental one in an analysis whose basic idea is to consider *the nation as a whole*, including government as a sector equally important to and logically (at least) on the same footing as the private sectors with respect to production. From this global viewpoint the concept of net national product at factor cost does not give, I think, a realistic description of what the nation can consume or invest, and is therefore not "more closely related to the utilization of resources".

In any analysis that really wants to focus its attention on the nation as a whole, the concept of "national income" should be constructed so that it becomes as much as possible indicative of "the result as such", and as little as possible dependent on the organizational form through which the result is obtained and distributed. This is essential both for comparisons between countries with different economic systems and for comparisons of the situations within the same country at different points of time between which the economic organization has changed.

This property certainly does *not* belong to the concept of factor cost. The factor cost figures may be changed so to speak at will simply by shifting to another system of remuneration. To use the example of the excise tax on the products of the tobacco industry, one only has to consider what will happen to the concept of national income at factor cost if the government decided to increase the excise tax on tobacco and to use the proceeds from this increase to finance, say, fundamental biological, agricultural or technical research that makes it possible to lower the cost in the tobacco industry as well as elsewhere; or to use the proceeds for improvements aimed specifically at the tobacco industry (land improvements, highway and railroad construction, etc., that are specifically useful to this industry); or even —as an extreme case— to use the proceeds for paying *the labour force in the tobacco industry* and putting this labour force at the free disposal of the enterprises in this industry. One may visualize a continuous range of such measures, all of which will not lower production in the true sense of the word, but will nevertheless as a pure accounting phenomenon with no

counterpart in reality, create a tendency to *lower* the figure for net national product at factor cost.

This is not as it should be if the purpose is to construct a national income concept that is as much as possible indicative of "the result as such" and as little as possible dependent on the organizational form through which the result is obtained and distributed. From such a viewpoint the difference between, say, paying a worker directly through a private enterprise, and paying him by way of the government budget, is only a formal one. From this viewpoint it must, therefore, appear as a very fictitious rule to say that when we look through the various expenditure items for an enterprise, those wages that the firm pays *directly* to the workers should *not* be deducted from the national product in order to arrive at the concept of national income (that is, a concept that is "more closely related to the utilization of resources"), while those wages that the firm pays by an accounting procedure that uses the government budget as an intermediate step, *should* be deducted.

To my mind, therefore, the factor cost concept is not an appropriate expression for "national income" if we have in mind the nation as such, the nation as an integrated producing and consuming unit, and we want to bring out the underlying real-economy aspects of this unit, that is to say, those aspects of the problem that are "more closely related to the utilization of resources".

What concept should be used then ? In order to make national accounting at all possible some sort of valuation coefficients have, of course, to be introduced. There is one such system that holds, logically, a unique position, namely the system *that is actually in force*, that is to say, that serves as the basis for the current operations and transactions in society at the time when the national income computations are made. This is the system of market prices.

If we take the concept of net national income at market prices and *deflate it* for time variations in the value of the monetary unit (by using an appropriately chosen deflator, or possibly a system of deflators), we have a concept which certainly is not ideal in all respects but is at least vastly superior to the concept of net national income at factor cost. By using deflated market prices we come as near as possible to constructing a measure of "national income" in the real-economy sense of the word.

I must stress that it is here a question only of the *definitional* connections in the system of concepts, that is, of the relations that exist by necessity through the choice of the accounting system. What sort of *structural* repercussions and ramifications of consequences any measure will have (that is, repercussions through its effects on incentives etc.) is, of course, a far-reaching question that cannot be settled by merely studying the definitional relations between the concepts. All we can say when speaking of the definitional system is that this system should be as *neutral* as possible in relation to the problem of comparing the specific structural repercussions.

In the table given in this paper, I have re-arranged the figures for the national income of the United States 1946 in the frame which I would prefer and

NATIONAL INCOME OF UNITED STATES, 1946

government	enterprises (corporated or unincorporated)	households (labour)	national total (national income at market price)
	emerging income		
	income of unincorporated enterprises and rental income of persons	41.8	
	net interest	3.4	
	dividends	5.6	wages and salaries	111.4
	corporate profit tax	9.0	net interest on the
	undistributed profit	7.2	public debt to households, say	1.1
net interest on the public debt	−4.4	inventory valuation adjustment (the writing off on inventories)	−5.0	net total	112.5	197.5
	indirect taxes etc. (17.5+0.6−0.9+1.0)	18.2	
	net interest on the public debt to enterprises, say	3.3	
	social insurance contributions	5.9	
	net total	89.4	

	earned income (after allowance for *indirect* taxes and subsidies)		
indirect taxes	17.5	indirect taxes	−17.5	
subsidies	−0.9	subsidies	0.9	
subtotal	16.6	subtotal	−16.6	net total	112.5	197.5
emerging income	−4.4	emerging income	89.4	
net total	12.2	net total	72.8	

disposable income
(after allowance for *all* taxes, government transfer payments (relief etc.) and business transfer payments, social insurance contributions, charitable contributions etc.)

government		enterprises		households		national total
social insurance contributions	5.9	social insurance contributions	−5.9	personal income tax	−18.9	
corporate profit tax	9.0	corporate profit tax	−9.0	government transfer payments	10.8	
personal income tax	18.9	business transfer payment (not including the cancelling of bad debts), say	−0.3	business transfer payments	0.3	
government transfer payments (relief etc.)	−10.8					
subtotal	23.0			subtotal	−7.8	
earned income	12.2	subtotal	−15.2	earned income	112.5	
net total	35.2	earned income	72.8	net total	104.7	197.5
		net total	57.6			

NATIONAL INCOME OF UNITED STATES, 1946 *(Continued)*

government		enterprises (corporated or unincorporated)		households (labour)	national total (national income at market price)

goods and services acquired
(after allowance for borrowing and lending operations)

government expenditure on goods and services	30.8	consumers' expenditure		147.3	export
		net investment at home		14.7	surplus
				———	4.7 197.?
		net total		162.0	

consumption

		expenditure on nondurable goods	87.5		
		expenditure on services	43.6		
		depreciation on households' physical capital, say	5.0		
say	30.8	net total	136.1	166.9	

net physical investment at home
(net increase in physical capital at home)

		new construction	8.9		
		producers' durable goods	12.8		
		net change in inventories	4.8		
		subtotal (gross private investment at home)	26.5		
		depreciation on private producers' physical capital at home	−11.8		
		expenditure on durable goods	16.2		
		depreciation on households' physical capital, say	−5.0		
say	0	net total	25.9	25.9	

net financial investment
(net increase in cash and claims)

| net total | 4.4 | net total | | 0.3 | 4.7 |
| | | | | | 197.5 |

which is used in our analytical work at the University Institute of Economics, Oslo. In this frame the concept of factor cost is avoided altogether.   We find our manner of presentation rather illuminating.   The table exhibits the fact that whatever internal transfers are made, leading in each individual sector to the hierarchy of concepts : emerging income, earned income, disposable income, and goods and services acquired, it is all the time *the same global concept* : national income at market prices, that makes up the total.

The sectors can and should, of course, be sub-divided in a more refined way than is done in this simplified example, but this will not affect the principle.

For certain minor items where break-downs were not given in the U.S. data, I have for the purpose of illustration simply split the figures by guessing.   These split figures are indicated by the word "say".   All other figures are in exact conformity with the official U.S. data.

Paper received : January, 1955.

A METHOD OF DISCRIMINATION IN TIME SERIES ANALYSIS—I*

By A. RUDRA

Indian Statistical Institute, Calcutta

1. INTRODUCTION

1.1. In an earlier paper bearing the same title and published elsewhere (Rudra, 1954), the author has outlined a method for discriminating on the basis of a given time series between stationary processes belonging to the autoregressive, the moving average, and the periodic types. For processes of the periodic type, a new model was suggested and used in our argument. The model is characterised by the relation

$$x_t = m_t + \epsilon_t = \Delta + \theta_t(p_1) + \theta_t(p_2) + \ldots + \theta_t(p_k) + \epsilon_t \qquad \ldots \quad (1.1)$$

$$\left(t = 1, 2, \ldots, N; \quad \sum_{t=1}^{p_j} \theta_t(p_j) = 0, \quad j = 1, 2, \ldots, k \right)$$

where x_t is the observed value at time point t. and $\theta_t(p_j)$ (t to be reduced mod p_j; $j = 1, 2, \ldots, k$) the parametric constants; ϵ_t is an independent variable with zero mean and a constant variance σ^2. The model contains periodicities of lengths $p_1, p_2, \ldots, p_k$. The quantity $\Omega(p_i) = \dfrac{1}{p_i - 1} \sum_{t=1}^{p_i} \dfrac{\theta_t^2(p_i)}{\sigma^2}$ was termed the 'variance' of the periodicity $p_i(i = 1, 2, \ldots, k)$ and was suggested as a measure of its importance. The method in a nutshell is to draw up the observed series $x_1, x_2, \ldots, x_N$ into a Buys-Ballot table for periodicity p in a chosen range (a, b) as follows :

Buys-Ballot table for Periodicity p

columns	(1)	(2)	...	(s)	...	(p)	
	x_1	x_2	...	x_s	...	x_p	
	x_{p+1}	x_{p+2}	...	x_{p+s}	...	x_{2p}	
	...		...	...	...	...	... (1.2)
	...		...	...	...		
	...		...	...	...		
	$x_{\overline{n(p)-1}\,p+1}$	$x_{\overline{n(p)-1}\,p+2}$ ...	$x_{\overline{n(p)-1}\,p+s}$ ...	...		
column means	$\bar{x}_1.(p)$	$\bar{x}_2.(p)\ldots$		$\bar{x}_s.(p)\ldots$		$\bar{x}_p.(p)$	$\bar{x}\ldots$

where $n(p)$, and s are given by $N = \overline{n(p)-1}\,p + s, \ s < p$. (general mean)

---

* Based on a thesis approved for the Ph. D. degree of the London University.

9

2

From each such table, an $F(p)$ is to be calculated by using the following formula :

$$F(p) = \frac{\text{between column sum of squares}}{\text{within column sum of squars}} \times \frac{N-p}{p-1} \qquad \dots \quad (1.3)$$

where the expressions 'between column sum of squares' and 'within column sum of squares' mean as in the analysis of variance for one way table.

The $F(p)$'s are then to be plotted against p and the F-diagram thus obtained used as the discriminating criterion. Decisions are to be made by following elaborate rules given in the aforementioned paper as to the occurrence of peaks in the three regions defined in the $\{p, F(p)\}$- space by the curves giving for each value of p the values $F_\alpha(p, N-p)$ and $F_\beta(p, N-p)$, which are the upper $\alpha\%$ and $\beta\%$ points of the standard F-distribution. 'See Diagram 1'.
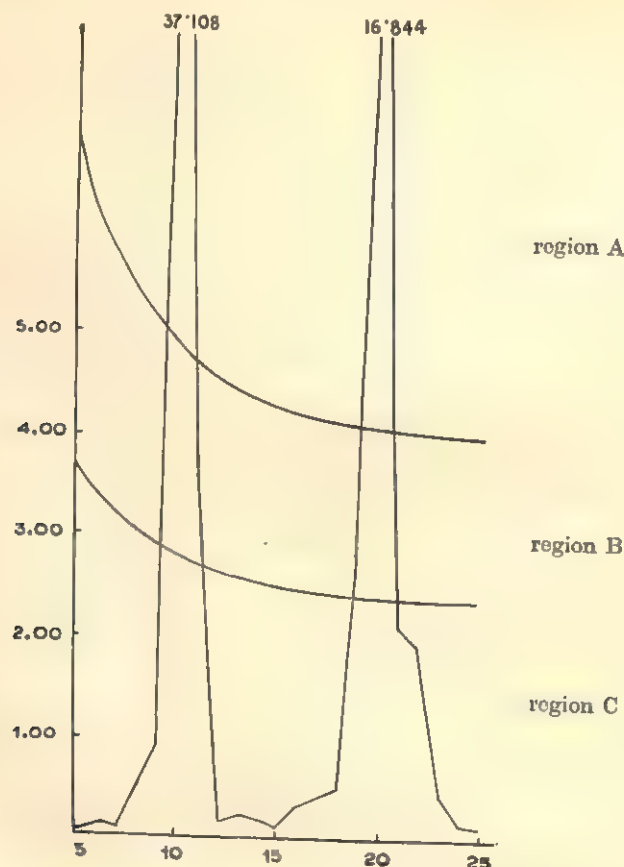
Diagram 1. Artificial cyclical ser.es.
One periodicity : 10. (Kendall)

1.2. In the present paper, we endeavour to justify the intuitive grounds on which the rules of procedure were outlined. We also describe the methods of fitting a Linear Cyclical Model to a series and of Retesting a periodicity after the elimination of other existing periodicities. Only the final results of applying our method to a large number of series were given in the previous paper. In the present paper we provide

a large number of the actual diagrams used, and more detailed tables and discussions, so that the actual working of the method under diverse circumstances may be rendered clear.

1.3. In order to maintain the continuity of arguments, we have thought it fit to take out of the body of the text proofs and demonstrations of certain assertions made and mathematical results used and keep them for later publication as Part II of the paper.

2. THE DISTRIBUTION OF $F(p)$ FOR A CYCLICAL SERIES

2.1. We shall write (1.1). as

$$x_t = m_t + \epsilon_t \qquad \dots \quad (2.1)$$

and consider the following two tabular arrangements :

columns	(1)	(2)	...	(s)	...	(p)	
	m_1	m_2	...	m_s	...	m_p	
	m_{p+1}	m_{p+2}	...	m_{p+s}	...	m_{2p}	
	...	...	...	...	...	...	
	$m_{\overline{n(p)-1}\,p+1}$	...	...	m_N	...	...	... (2.2)
column means	$m_1.(p)$	$m_2.(p)$		$m_s.(p)$		$m_p.(p)$	$m_{..}$ general mean

and

columns	(1)	(2)	...	(s)	...	(p)	
	ϵ_1	ϵ_2	...	ϵ_s	...	ϵ_p	
	ϵ_{p+1}	ϵ_{p+2}	...	ϵ_{p+s}	...	ϵ_{2p}	... (2.3)
	...	...	...	...	...		
	$\epsilon_{\overline{n(p)-1}\,p+1}$	...	...	ϵ_N	...		
column means	$\epsilon_1.(p)$	$\epsilon_2.(p)$		$\epsilon_s.(p)$		$\epsilon_p.(p)$	$\epsilon_{..}$ general mean

These are Buys-Ballot tables constructed out of the series (m_t) and (ϵ_t) $(t=1, 2, ..., N)$. For the sake of convenience we shall use the symbols $y_{ij}(p)$, $m_{ij}(p)$ and $\epsilon_{ij}(p)$ to denote the elements belonging to the jth row and the ith columns of (1.2), (2.2) and (2.3) respectively. In other words, we shall rewrite (1.2) as :

columns	(1)	(2)	...	(s)	...	(p)	
	$y_{11}(p)$	$y_{21}(p)$	...	$y_{s1}(p)$	...	$y_{p1}(p)$	
	$y_{12}(p)$	$y_{22}(p)$	...	$y_{s2}(p)$	...	$y_{p2}(p)$	
	...	...	...	...	...		
	$y_{1n(p)}(p)$	$y_{2n(p)}(p)$	...	$y_{sn(p)}(p)$	...	...	... (2.4)
column means	$\bar{y}_1.(p)$	$\bar{y}_2.(p)$		$\bar{y}_s.(p)$		$\bar{y}_p.(p)$	$y_{..}$ general mean

and similarly for (2.2) and (2.3).   Then, as a result of (2.1),

$$y_{ij}(p) = m_{ij}(p) + \epsilon_{ij}(p),$$
$$\bar{y}_{i\cdot}(p) = m_{i\cdot}(p) + \epsilon_{i\cdot}(p)$$
$$\bar{y}_{\cdot\cdot} = m_{\cdot\cdot} + \epsilon_{\cdot\cdot} .$$

$$\dots \quad (2.5)$$

2.2.   We shall refer to (1.2), (2.2) and (2.3) as the Y-table, the M-table and the E-table respectively.   For each of these the 'between column sum of squares' and the 'within column sum of squares' and their interrelations are shown in the following where $n_i(p) = n(p)$ if $i \leqslant s$ and $= n(p) - 1$, if $i > s$.

	d.f.	M-table	E-table	Y-table
between column SS.	$p-1$	$\sum\limits_{i=1}^{p} (m_{i\cdot}(p) - m_{\cdot\cdot})^2 n_i(p)$	$\sum\limits_{i=1}^{p} (\epsilon_{i\cdot}(p) - \epsilon_{\cdot\cdot})^2 n_i(p)$	$\sum\limits_{i=1}^{p} \{(m_{i\cdot}(p) - m_{\cdot\cdot}) + (\epsilon_{i\cdot}(p) - \epsilon_{\cdot\cdot})\}^2 n_i(p)$
within column SS.	$N-p$	$\sum\limits_{i,j}^{N} (m_{ij}(p) - m_{i\cdot}(p))^2$	$\sum\limits_{i,j}^{N} (\epsilon_{ij}(p) - \epsilon_{i\cdot}(p))^2$	$\sum\limits_{i,j}^{N} \{(m_{ij}(p) - m_{i\cdot}(p)) + (\epsilon_{ij}(p) - \epsilon_{i\cdot}(p))\}^2$
total SS.	$N-1$	$\sum\limits_{i,j}^{N} (m_{ij}(p) - m_{\cdot\cdot})^2$	$\sum\limits_{i,j}^{N} (\epsilon_{ij}(p) - \epsilon_{\cdot\cdot})^2$	$\sum\limits_{i,j}^{N} \{(m_{ij}(p) - m_{\cdot\cdot}) + (\epsilon_{ij}(p) - \epsilon_{\cdot\cdot})\}^2$

$$\dots \quad (2.6)$$

The three sums of squares from the Y-table, divided by σ^2 (which is the variance of the random component $\epsilon_{ij}(p)$)

$$\frac{\sum\limits_{i,j}^{N} \{y_{ij}(p) - \bar{y}_{\cdot\cdot}\}^2}{\sigma^2}, \quad \frac{\sum\limits_{i,j}^{N} \{y_{ij}(p) - \bar{y}_{i\cdot}(p)\}^2}{\sigma^2} \text{ and } \frac{\sum\limits_{i=1}^{p} \{\bar{y}_{i\cdot}(p) - \bar{y}_{\cdot\cdot}\}^2 n_i(p)}{\sigma^2}$$

$$\dots \quad (2.7)$$

are therefore distributed as noncentral chi-squares with $N-1$, $N-p$, and $p-1$ degrees of freedom, and non centrality parameters

$$(N-1)\beta = \sum_{i,j}^{N} \frac{\{m_{ij}(p) - m_{\cdot\cdot}\}^2}{\sigma^2}$$

$$(N-p)\eta(p) = \sum_{i,j}^{N} \frac{\{m_{ij}(p) - m_{i\cdot}(p)\}^2}{\sigma^2}$$

$$\dots \quad (2.8)$$

and

$$(p-1)\lambda(p) = \sum_{i=1}^{p} \frac{\{m_{i\cdot}(p) - m_{\cdot\cdot}\}^2 n_i(p)}{\sigma^2}$$

respectively, provided ϵ_i is assumed to be normal.

We shall denote these three noncentral chi-squares by

$$\chi^2_{N-1}[\beta], \; \chi^2_{N-p}[\eta(p)], \text{ and } \chi^2_{p-1}[\lambda(p)] \quad \text{respectively.}$$

(This notation does not agree with that used by Tang (1938), Patnaik (1949), etc. who would write the same as $\chi^2_{N-1}[(N-1)\beta]$, $\chi^2_{N-p}[(N-p)\eta(p)]$ and $\chi^2_{p-1}[(p-1)\lambda(p)]$ respectively). $F(p)$ therefore can be regarded as the ratio of two noncentral chi-squares, multiplied by a constant factor :

$$F(p) = \frac{\chi^2_{p-1}[\lambda(p)]}{\chi^2_{N-p}[\eta(p)]} \cdot \frac{N-p}{p-1}. \qquad \cdots \quad (2.9)$$

2.3. It will be shown in Part II by an easy extension of Cochran's theorem that the two noncentral chi-squares $\chi^2_{p-1}[\lambda(p)]$ and $\chi^2_{N-p}[\eta(p)]$ are independent. The distribution of $F(p)$ therefore can be obtained from that of the ratio of two independent noncentral chi-squares given by Tang (1938), and it is as follows :

$$P[F(p)] = \sum_{i=0}^{\infty} \sum_{j=0}^{\infty} \frac{\lambda(p)^i}{i! 2^i} \frac{\eta(p)^j}{j! 2^j} \frac{(p-1)^i (N-p)^j}{B\left(i + \frac{p-1}{2}, j + \frac{N-p}{2}\right)} \left\{ \frac{\frac{p-1}{N-p}F(p)}{1 + \frac{p-1}{N-p}F(p)} \right\}^{p+i-1} \times$$

$$\times \left\{ \frac{1}{1 + \frac{p-1}{N-p}F(p)} \right\}^{N-p+j+1} \qquad \cdots \quad (2.10)$$

For constant p and large $N-p$, $F(p)$ is asymptotically distributed as

$$\frac{\chi^2_{p-1}[\lambda(p)]}{[1+\eta(p)](p-1)} \qquad \cdots \quad (2.11)$$

so that its first four asymptotic cumulants are

$$\left. \begin{aligned} \kappa_1[F(p)] &= \frac{1+\lambda(p)}{1+\eta(p)}, \\[2mm] \kappa_2[F(p)] &= \frac{2[1+2\lambda(p)]}{(p-1)(1+\eta(p))^2}, \\[2mm] \kappa_3[F(p)] &= \frac{8[1+3\lambda(p)]}{(p-1)^2[1+\eta(p)]^3}, \\[2mm] \kappa_4[Fp)] &= \frac{48[1+4\lambda(p)]}{(p-1)^3[1+\eta(p)]^4}. \end{aligned} \right\} \qquad \cdots \quad (2.12)$$

3. F-DIAGRAM FOR A SERIES HAVING A SINGLE PERIODICITY

3.1. Though we have found the distribution of a single $F(p)$, it is difficult to obtain the distribution of a collection of $F(p)$'s which is the F-diagram, especially so as they are mutually dependent. We shall however show in Part II that arguments

as to the behaviour of the F-diagram under different hypotheses can be carried out in terms of the first moment of $F(p)$ only. If $\pi(p)$ be the first moment of $F(p)$, and if $\pi(p)$ regarded as a function of p between a and b be called the π-diagram, the latter can be regarded as an indicator of the probable behaviour of the F-diagram as to points of occurrence of peaks, and their relative magnitudes. In the present section, we shall study in terms of the π-diagram the probable behaviour of the F-diagram for a Linear Cyclical series having a single periodicity.

3.2. The nature of the π-diagram depends on the relative magnitudes of $\lambda(p)$ and $\eta(p)$. When the series has only one periodicity p_0,

$$m_t = \alpha_t(p_0) = \Delta + \theta_t(p_0).$$

As $\alpha_t(p_0) = \alpha_{t+sp_0}(p_0)$ for any integral s, the M-table for trial period p_0 has the following appearance :

columns	(1)	(2)	...	(s)	...	(p_0)
	$\alpha_1(p_0)$	$\alpha_2(p_0)$	...	$\alpha_s(p_0)$	...	$\alpha_{p_0}(p_0)$
	$\alpha_1(p_0)$	$\alpha_2(p_0)$	...	$\alpha_s(p_0)$	...	$\alpha_{p_0}(p_0)$
	$\vdots$	$\vdots$		$\vdots$		$\vdots$
	$\alpha_1(p_0)$	$\alpha_2(p_0)$	...	$\alpha_s(p_0)$.		
column means	$\alpha_1(p_0)$	$\alpha_2(p_0)$	...	$\alpha_s(p_0)$	...	$\alpha_{p_0}(p_0)$

$$\text{... (3.1)}$$

It will be noticed that,

$$\eta(p_0) = 0,$$

and

$$\lambda(p_0) = \frac{N-1}{p_0-1}\,\beta,$$

so that

$$(n(p_0)-1)\,\Omega\,(p_0) \leqslant \lambda(p_0) < n(p_0)\,\Omega\,(p_0).$$

Hence

$$\pi(p_0) = 1+\lambda(p_0) = 1 + \frac{N-1}{p_0-1}\,\beta \simeq 1 + n(p_0)\Omega(p_0). \qquad \text{... (3.2)}$$

The only other values of the trial period p for which $\eta(p)$ is zero are the multiples of p_0. Thus for any positive integer s,

$$\eta(sp_0) = 0,$$

$$\lambda(sp_0) = \frac{N-1}{sp_0-1}\,\beta,$$

$$\pi(sp_0) = 1 + \frac{N-1}{sp_0-1}\beta = 1 + \frac{(p_0-1)\lambda(p_0)}{(sp_0-1)} \simeq 1 + \frac{(p_0-1)}{(sp_0-1)}\,n(p_0)\Omega(p_0). \qquad \text{... (3.3)}$$

It should be noted that $\pi(sp_0) < \pi(\overline{s-1}p_0)$ for all s.

3.3.   For all other values of p, it is reasonable to suppose that the variations within columns and between columns are more or less the same (as a result of remaining unaffected by the arbitrary grouping in columns which have no phase-relation with the periodicity of the data).

If it is so,

$$\lambda(p) \simeq \eta(p) \simeq \beta \qquad \text{for} \ \ p \neq p_0 \neq sp_0;$$

$$\pi(p) = \frac{1+\lambda(p)}{1+\eta(p)} \simeq \frac{1+\beta}{1+\beta} = 1. \qquad \qquad \ldots \ (3.4)$$

Thus, for a series having only one periodicity p_0, the π-diagram will more or less follow the line $\pi(p) = 1$ at all points except $p = p_0, 2p_0, 3p_0$ etc., where there will be sharp peaks. The sharpness would depend on the magnitude of β, which would depend on $\Omega(p_0)$, the 'variance' of the periodicity, as well as the number of rows $n(p_0)$, which increases with the length of the series N; further, the peaks at $p_0, 2p_0, 3p_0$, etc., will be of progressively diminishing magnitude.

3.4.   It is however quite possible for the relation (3.4) not to hold. $\eta(p)$ may in certain cases be much smaller than $\lambda(p)$ making

$$\pi(p) = \frac{1+\lambda(p)}{1+\eta(p)}$$

greater than unity.   There is therefore the possibility of observing peaks at points that do not correspond to any real periodicity.   Hence it is of importance to study the factors that affect $\pi(p)$.   This will be done in detail in Part II.   It is sufficient to note here that, as was mentioned in the previous papers, the value of $\pi(p)$ depends on, (i) the actual nature of oscillation of the periodic series $\theta_1(p_0), \theta_2(p_0), \ldots, \theta_{p_0}(p_0), \theta_1(p_0), \theta_2(p_0), \ldots, \theta_{p_0}(p_0), \theta_1(p_0), \ldots$;   (ii) the number of rows $n(p_0)$; and (iii) the relative values of p and p_0.   There is a smaller chance of having a spurious peak at $p \neq sp_0$ if p and p_0 are relatively prime than if they are not.

Though it is possible to have peaks in the π-diagram at points not corresponding to the true periodicity, it can be proved that as long as $p > p_0$, $\pi(p)$ cannot be greater than $\pi(p_0)$.

4. F-Diagram for a series having several periodicities

4.1.   The F-diagram for a series having more than one periodicity is more complicated to study under different hypotheses than that for one with a single periodicity.

15

Suppose that there are k periodicities $p_1, p_2, ..., p_k$. When $p=p_i(i=1, 2, ..., k)$, the M-table can be written as

columns

| (1) | (2) | ......p_i |

$$m'_{11}(p_i)+\theta_1(p_i) \qquad m'_{21}(p_i)+\theta_2(p_i) \cdots\cdots m'_{p_i 1}(p_i)+\theta_{p_i}(p_i)$$

$$m'_{12}(p_i)+\theta_1(p_i) \qquad m'_{22}(p_i)+\theta_2(p_i) \cdots\cdots m'_{p_i 2}(p_i)+\theta_{p_i}(p_i)$$

$$\vdots \qquad\qquad \vdots \qquad\qquad \vdots$$

$$\text{...} \quad (4.1)$$

column means
$$m'_{1\cdot}(p_i)+\theta_1(p_i) \qquad m'_{2\cdot}(p_i)+\theta_2(p_i) \qquad m'_{p_i\cdot}(p_i)+\theta_{p_i}(p_i)$$

where
$$m'_{ts}(p_i) = m_{ts}(p_i)-\theta_t(p_i),$$

$$m'_{t\cdot}(p_i) = m_{t\cdot}(p_i)-\theta_t(p_i),$$

$$(t = 1, 2, ..., p_i; \quad s = 1, 2, ..., n(p_i)).$$

Thus, even when $p=p_i$, $\eta(p_i)$ does not vanish. But because there is in the t-th column an element $\theta_t(p_i)$ common to each row, we may reasonably expect the variation within column to be less than when there are no elements common to the different rows in the same column. The same observations might be made for the case when $p=sp_i$. On the other hand, we may reasonably expect that when $p \neq s\,p_i$, $\lambda(p) \simeq \eta(p) \simeq \beta$. In other words, we may expect the following relations to hold :

$$\pi(p) = \frac{1+\lambda(p)}{1+\eta(p)} \simeq \frac{1+\beta}{1+\beta} = 1, \qquad\qquad \text{...} \quad (4.2)$$

when
$$p \neq sp_i \qquad (i = 1, 2, ..., k; \quad s = 0, 1, ...);$$

and
$$\eta(p) < \beta, \qquad \lambda(sp_i) > \beta,$$

so that
$$\pi(p) = \frac{1+\lambda p)}{1+\eta(p)} > 1 \qquad\qquad \text{...} \quad (4.3)$$

when
$$p = sp_i.$$

4.2. Of course these relations may not always be satisfied. It can be imagined that in certain cases even for $p \neq sp_i$, $\lambda(p)$ will be considerably larger than $\eta(p)$, and then we shall have a peak at a point which does not correspond to a real periodicity. It is however reasonable to assume that this peak will be of less magnitude than those at the more important of the peaks at $p_i(i = 1, 2, ..., k)$. It can also be imagined that only the more important of the periodicities $p_i(i=1, 2, ..., k)$ will be marked by prominent peaks and that some of the less important ones may fail to produce any peaks at all. In exactly the same way as for the case of a single period, the F-diagram is also likely to have peaks at the multiples sp_i of the actual periods p_i. The peaks at these points should in the ordinary case be less pronounced than those at the actual period p_i, but if the same point happens to be a multiple of two periodicities p_i and

$p_j (i \neq j)$, then the peak at $sp_i = rp_j$ may be more pronounced than either of the peaks at p_i and p_j. Further references to the case when there is more than one periodicity in the series will be made in Part II. Our conjectures as to the occurrence and relative magnitudes of peaks for series having general periodicities will be found on the whole correct regarding quite a few artificial series discussed in section 8.

5. F-Diagram for a linear regressive series

5.1. The distribution of $F(p)$ for a linear regressive series has not been studied, but it will be shown in Part II that the first two moments are asymptotically given by

$$\mu_1\{F(p)\} = 1 - n(p)\bar{\rho},$$

$$\cdots \quad (5.1)$$

$$\mu_2\{F(p)\} = \frac{2}{p}\left(1 - \frac{p}{p-1} n(p)\bar{\rho}\right)^2\left(1 + \overline{p-1}\ \bar{\rho}_{ij}^2(p)\right),$$

where $\rho_1, \rho_2, \ldots, \rho_{N-1}$ are the auto-correlations of the process, and

$$\bar{\rho} = \frac{2}{N(N-1)}\left\{\sum_{i=1}^{N-1} (N-i)\rho_i\right\},$$

$$\cdots \quad (5.2)$$

and

$$\bar{\rho}_{ij}^2(p) = \frac{2}{p(p-1)} \sum_{i,j}^{p} \rho_{ij}^2(p),$$

where $\rho_{ij}(p)$ is the correlation between $(\bar{y}_{i.}(p) - \bar{y})$ and $(\bar{y}_{j.}(p) - \bar{y}..)$, $(i, j = 1, 2, \ldots, p)$. It will also be shown that $\bar{\rho}$ can never be less than $-\frac{1}{N-1}$, and this, for large N, is very near to zero. (The upper bound for $\bar{\rho}$ in the case of a moving average model is also very near to zero). The first moment of $F(p)$ will therefore be for all values of p at or below the level of unity; and the second moment will be of the order of $\frac{2}{p-1}$ which is the second moment for a random series.

5.2. It is reasonable to expect on the basis of these results that the F-diagram for a linear regressive series will not in general have prominent peaks and will on the whole lie at a lower level than that for a random series. There can of course be chance peaks, but they will not generally be as prominent as those for a cyclical series. That our intuitive reasoning is not incorrect will be clear from a comparison of diagrams 5 to 13 with diagrams 1 to 4. This is one point where our method is clearly superior to that of Schuster. It is well known that Schuster's Periodogram gives for linear regressive series spurious peaks of the same order of magnitude as for cyclical series.

6.   F-Diagram as a discriminator

6.1.   The analysis of the last few sections, we believe justify the method of discrimination we have outlined in our previous paper.   We have found that, for cyclical series, there are likely to be peaks at the true periodicities, their sharpness depending on the strength of the periodicities.   We have also found that there are likely to be spurious peaks at the multiples of true periodicities, and that it is possible for both cyclical and linear regressive series to produce spurious peaks of comparatively smaller prominence at any point whatsoever.   It can also be surmised that in a F-diagram for a series having several periodicities, peaks due to less important periodicities may get damped or even quite obliterated due to the influence of the other periodicities. It is to take care of all these disturbing factors that the device for a cautionary zone and the technique of Retest have been introduced.

6.2.   The justification for using probability points of the standard F-distribution to define the regions in $\{p, F(p)\}$ space lies in the fact that departures from randomness (for which hypothesis the use of these points is valid) towards linear cyclical processes and towards linear regressive processes have exacty opposite effects on the F-diagram.

The choice of α and β has of course got to be arbitrary: they cannot possibly have any precise meaning as to the chance of correct decision with regard to any specific hypothesis.   But then, a little reflection will show that, for the very large number of hypotheses we have chosen for our field of discrimination it is impossible to have any method whatsoever that will give correct decisions in a specified proportion of cases.

6.3.   We shall like to mention here two points which are of some technical interest in the F-analysis of a given series by our method.

(1)   If a series is linearly cyclical, then, comparison between the linear regressive and the linear cyclical models when all the peaks in the F-diagram are in Region B may not be possible owing to there being not any optimum linear regressive fit. Hence if we find that the serial correlations over more than a reasonable number of stages are being significant, we may abandon the sequence and decide in favour of the cyclical model.

(2)   The method of obtaining residuals from a moving average fit is to express the moving average as an autoregressive, and to obain the residual from the fit in the usual way.

7.   Fitting a linear cyclical model to data and the technique of re-testing

7.1.   When it has been finally decided that a series is cyclical with certain definite periodicities, the next step is to fit a linear cyclical model to the data.   Suppose we have decided on a model $M(p_1, p_2, ..., p_k)$.   The problem now is of estimating the parameters Δ, $\theta_1(p_i)$, $\theta_2(p_i)$, ..., $\theta_{p_i}(p_i)$ $(i = 1, 2, ..., k)$ in the equation

$$x_t = \Delta + \theta_t(p_1) + \theta_t(p_2) + ... + \theta_t(p_k) + \epsilon_t. \qquad ...\ (7.1)$$

The least squares approach requires the solution of the following set of equations :

$$
\left.\begin{array}{l}
\dfrac{\partial}{\partial\Delta}\displaystyle\sum_{t=1}^{N}\Big\{x_t-\Delta-\theta_t(p_1)-\theta_t(p_2)-\ldots-\theta_t(p_k)\Big\}^2 = 0, \\[20pt]
\dfrac{\partial}{\partial\theta_i(p_j)}\displaystyle\sum_{t=1}^{N}\Big\{x_t-\Delta-\theta_t(p_1)-\theta_t(p_2)-\ldots-\theta_t(p_k)\Big\}^2 = 0 \\[20pt]
\qquad\qquad (i=1,2,\ldots,p_j;\quad j=1,2,\ldots,k).
\end{array}\right\} \quad\ldots\ (7.2)
$$

If we write s_i for the remainder when N is divided by $p_i(i=1,2,\ldots,k)$, the first equation is equivalent to

$$
\begin{aligned}
x_{..} = \Delta+\frac{1}{N}\Big[& \{\theta_1(p_1)+\theta_2(p_1)+\ldots+\theta_{s_1}(p_1)\} \\
& + \{\theta_1(p_2)+\theta_2(p_2)+\ldots+\theta_{s_2}(p_2)\} \\
& + \ .\ \ \ .\ \ \ . \\
& \\
& + \{\theta_1(p_k)+\theta_2(p_k)+\ldots+\theta_{s_i}\ (p_k)\}\Big]
\end{aligned}
\qquad \ldots\ (7.3)
$$

since
$$
\sum_{t=1}^{p_i}\theta_t(p_i) = 0 \quad (i,=1,2,\ldots,k).
$$

The typical equation of the remaining set reduces to

$$
\bar{x}_{i.}(p_j) = \Delta+\theta_i(p_j)+\delta_{i.}(p_j) \qquad\qquad \ldots\ (7.4)
$$
$$
(i=1,2,\ldots,p_j;\ j=1,2,\ldots,k)
$$

where
$$
\delta_{i.}(p_j) = m_{i.}(p_j)-\theta_i(p_j)-\Delta.
$$

The above set of equations contain too many constants to be solved by any direct means, and it is suggested that the method of iteration be used, taking $\bar{x}_{..}$ as the first approximation to Δ, and $\bar{x}_{i.}(p_j)$ as the first approximation to $\Delta+\theta_i(p_j)$. This first approximation $\bar{x}_{i.}(p_j)$ will of course be the actual solution for $\Delta+\theta_i(p_j)$ when p_j is the only periodicity present in the series. Another situation, when the first approximations in the iterative procedure happen to be the actual solutions, is when $p_1, p_2, \ldots, p_k$ are all relatively prime to each other and N is a common multiple of each of them. Under these circumstances, $\delta_{i.}(p_j) = 0(i=1,2,\ldots,p_j; j=1,2,\ldots,k)$. Even if N is not a common multiple of $p_1, p_2, \ldots, p_k$, $\delta_{i.}(p_j)\to 0$ as N is increased, provided $p_1, p_2, \ldots, p_k$ are relatively prime (Proof given in Part II). But only in rare circumstances shall we have such an ideally suitable collection of $p_1, p_2, \ldots, p_k$ and N. If $p_1, p_2, \ldots, p_k$ are mutually prime, but N is not a common multiple of them, nor is it very large, it

is possible to achieve the simplicity of the solution by adjusting the length N such that N is a common multiple of the periodicities, adjustment being done by rejecting some initial or end observations. The utility of this device would of course depend on the number of observations that would be lost in the process. Estimation would be less accurate if based on a smaller number of observations, but saving in computational labour would be enormous.

7.2. The idea of re-testing is as follows:

Suppose, that we unconditionally accept the periodicity p_1 and want to test whether the periodicity p_2 can also be considered as significant.

The test criterion yielded by the Likelihood Ratio method is

$$\frac{\sum_{t=1}^{N} \{x_t - \hat{\Delta}' - \hat{\theta}'_t(p_1)\}^2 - \sum_{t=1}^{N} \{x_t - \hat{\Delta} - \hat{\theta}_t(p_1) - \hat{\theta}_t(p_2)\}^2}{\sum_{t=1}^{N} \{x_t - \hat{\Delta} - \hat{\theta}_t(p_1) - \hat{\theta}_t(p_2)\}^2} \qquad \ldots \quad (7.5)$$

where $\hat{\Delta}' \hat{\theta}'_t(p_1)$ $(t=1, 2, ..., p_1)$ are the maximum likelihood estimates of the parameters in the model $M(p_1)$ and $\hat{\Delta}$, $\hat{\theta}_t(p_1)$ $(t=1, 2, ..., p_1)$ and $\hat{\theta}_t(p_2)$ $(t=1, 2, ..., p_2)$ the maximum likelihood estimates of the parameters in the model $M(p_1, p_2)$. There are two situations when the criterion (7.5) takes particularly simple forms.

(a) If p_1 and p_2 are relatively prime, and if N is a common multiple of p_1 and p_2, the least squares estimates $\hat{\Delta}$, $\hat{\theta}_t(p_1)$, $\hat{\theta}_t(p_2)$, and $\hat{\Delta}'$, $\hat{\theta}'_t(p_1)$ are given by

$$\hat{\Delta} = \hat{\Delta}' = \bar{x}..,$$

$$\hat{\theta}_t(p_1) = \hat{\theta}'_t(p_1) = \bar{x}_t.(p_1) - \bar{x}..; \quad (t=1, 2, ..., p_1),$$

$$\hat{\theta}_t(p_2) = \bar{x}_t.(p_2) - \bar{x}..; \quad (t=1, 2, ..., p_2), \qquad \ldots \quad (7.6)$$

so that (7.5) reduces to

$$\frac{\sum_{t=1}^{p_2} \{\bar{x}_t.(p_2) - \bar{x}..\}^2 n_t(p_2)}{\sum_{t=1}^{N} (x_t - \bar{x}..)^2 - \sum_{t=1}^{p_1} (\bar{x}_t.(p_1) - \bar{x}..)^2 n_t(p_1) - \sum_{t=1}^{p_2} \{\bar{x}_t.(p_2) - \bar{x}..\}^2 n_t(p_2)} \qquad \ldots \quad (7.7)$$

which we may treat as $F_{p_2-1, N-p_1-p_2+1} \times \dfrac{p_2-1}{N-p_1-p_2+1}$ under the null hypothesis. The result holds approximately true even if N is not a common multiple of p_1 and p_2 provided it is large.

(b) The second situation is when p_2 is a multiple of p_1. Let $p_2 = 2p_1$. It will be seen that only $2p_1$ out of the $3p_1$ parameters involved in the model can be estimated, as the least square equations (7.2) are not all independent. (7.5) will be found to reduce to

$$\frac{\sum\limits_{t=1}^{2p_1}\{\bar{x}_t.(2p_1)-\bar{x}..\}^2 n_t(2p_1) - \sum\limits_{t=1}^{p_1}\{x_t.(p_1)-\bar{x}..\}^2 n_t(p_1)}{\sum\limits_{t=1}^{N}(x_t-\bar{x}..)^2 - \sum\limits_{t=1}^{2p_1}\{x_t(2p_1)-\bar{x}..\}^2 n_t(2p_1)} \qquad \ldots \quad (7.8)$$

which we may treat as a $F_{p_1,\ N-2p_1} \times \dfrac{p_1}{N-2p_1}$ under null hypothesis. For all other values of p_1 and p_2, it is suggested that $\theta_t(p_1)$, $(t=1,2,\ldots,p_1)$ be estimated by $\{x_t.(p_1)-\bar{x}..\}$ $(t=1, 2, \ldots, p_1)$. Then, let this estimate $\hat{\theta}_t(p_1)$ $(t=1, 2, \ldots, N)$ (t reduced mod p) be subtracted from x_t $(t=1, 2, \ldots, N)$, and let the residual series be subjected to a fresh F-analysis. If the recalculated F at p_2, which we may denote by $F(p_2/p_1)$ be significant, we accept p_2 as a real periodicity; if not, we reject the peak at p_2 as a spurious effect. The significance of a Retest F can be judged by comparing it with the lower significance line; that is what we have done in our illustrative examples.

8. Illustrations: artificial series

8.1. In the present section we shall discuss in detail the application of our method of discrimination to some artificially constructed Linear Cyclical and Linear Regressive series, and also illustrate the methods of fitting and that of retesting. The final results were provided without commentary in our previous paper. In all the examples we have chosen α and β to be 0.01 and 0.0001 respectively. The choice was made on our finding that cyclical series in general produce extremely sharp peaks, while there is considerable danger of choosing as significant peaks due to series that are purely random if the levels are lowered much further. We have chosen these figures after obtaining and studying our F-diagrams, and therefore, the arbitrary nature of the classifications needs no emphasis.

8.2. There are in all sixteen series. The first is a cyclical series given in Kendall (1946). The next six are artificial series constructed by the author, the first three being cyclical and the next three being moving averages. The remaining are all autoregressive series given by Kendall (1949). Diagrams 1 to 16 are the F-diagrams for these series. Table 1 summarises the actions and decisions taken on the basis of the diagrams in a self explanatory way.

8.3. Diagram 1 faithfully bears out everything we have said in section 3. The series is cyclical with a single periodicity. The diagram has only two peaks, one at the true value of the periodicity 10, and another at its multiple 20, the second peak being smaller in magnitude than the first.
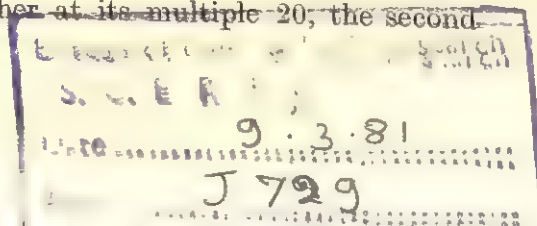
8.4.   The series for diagrams 2 to 4 have been built up in the following way. First, a random series with a rectangular distribution was taken; to it was added a cycle of length 8; this gave our series 3 (diagram 4).   To this was then added a cycle of length 12 to give our series 2 (diagram 3).   Lastly, series 1 (diagram 2) was obtained from series 2 by adding to the latter a cycle of length 5.   Thus the three series have the same random part, and are well suited for studying the effect on the diagram of the simultaneous existence of several periodicities of different strengths.   It will be observed that $F(8)$ in diagram 3 is less prominent than in diagram 4 due to the influence of cycle 12, and still more so in diagram 2 due to the added influence of the more powerful cycle 5.   Also interesting is the fact that the cycle 12 fails to produce a peak in any of the diagrams.   This cycle has the least variance of all, and its effect is completely obscured.   Again in diagram 2, the more important cycle 8 produces a sharper peak than 5, as we expect.

8.5.   Diagram 2 shows three peaks in region A, at 5, 8 and 16, and two in region B, at 10 and 25.   According to our rules, we decide that the series is periodic.   We unconditionally accept the values 5 and 8 and treat the peaks at 10, 16, and 25, with caution as they are multiples of 5 and 8.   In order to retest these cycles, we should eliminate 5 and 8 simultaneously.   But the fact that the peaks at the multiple points are smaller in sharpness than those at 5 and 8, suggest that the former are merely reflections of the latter.   If that is so, the peak at 16 would vanish if we eliminate 8 only whether we eliminate 5 or not.   Similarly, in retesting 10, we may eliminate 5 only.   By this means we can save computational labour and use the convenient formula (7.8).

Re-test for cycle 16:

total sum of squares	:	95713.2
sum of squares due to period 8	:	47958.5
sum of squares due to period 16	:	48712.5
sum of squares due to 16 when 8 is eliminated	:	48712.5—47958.5
		=754.0
residual sum of squares	:	95713.2—48712.5
		=47000.7

$$F(16/8) = \frac{754.0}{47000.7} \times \frac{104}{8}$$

$$= 0.2086$$

(Note should be made of the fact that the error sum of squares is the same as the within column sum of squares in the Buys-Ballot Table for trial period 16.   This is due to the fact that we cannot construct a model having two distinct periodicities 8 and 16, and having 24 parameters in all: we can fit at most 16 parameters and the fit is the same as if we were fitting a model involving one period of length 16 only.)

Re-test for cycle 10 :

total sum of squares	: 95713.2
sum of squares due to 10	: 16410.3
sum of squares due to 5	: 20010.7
sum of squares due to 10 when 5 is eliminated	: 3600.4
error sum of squares	: 75702.5

$$F(10/5) = \frac{3600.4}{75702.5} \times \frac{100}{5} = 1.0463$$

Both the re-tests give nonsignificant results. Similar result is obtained for 25. Hence we decide that the series contains only two periodicities, 5 and 8.

8.6. Diagram 3 is extremely interesting in that while we know that the series contains only two periodicities 8 and 12, there are in the diagram three peaks at 8, 16 and 24 ; the one at 16 is smaller than that at 8, but the one at 24 is larger than that at 8. Judging by the diagram, we would suspect that the peak at 8 is genuine and the one at 16 is a reflection of that at 8. But we cannot say that the peak at 24 is also a reflection of the one at 8, for if it were so, it would very probably be less than that at 8. We suspect that there are some genuine periodic elements at 24 and this is what the re-test establishes. Hence we conclude that the series is periodic with two periods, 8 and 24. Thus, the genuine period 12 is obscured by the period 8; but 24, being a multiple of both 8 and 12, becomes more pronounced than either of the actual ones.

8.7. The Linear Regressive series also on the whole behave according to our expectations. All but Kendall's 4, 12, 14, 16 and the artificial MA (2) (that is, moving average of order 2) series (author's 5) have diagrams lying entirely in region C. Series 12 and 14 produce peaks in the region A, and our method therefore gives wrong decisions regarding them. The others have peaks in region B. According to our method, we should first of all see which of the peaks may be considered significant, if the series is at all periodic. Then we have to compare the fit of the periodic model with the optimum linear regressive fit. This is done in Table 3. Series 16 has peaks at 7, 14 and 21, in region B, and the peak at 14 is found nonsignificant. Series 4 has two peaks in region B, at 13 and 15, the one at 15 being smaller. We subject the period 15 to a re-test. As 15 is not a multiple of 13, as suggested in the section 7 we carry out an approximate re-test by estimating the periodic elements of period 13 by the column means for period 13, subtracting them from the series, rearranging the residual series in a Buys-Ballot table for period 15, and calculating a fresh F-ratio for this table. There is, however, no need of actually obtaining the residual series. The total sum of squares for the residual series is just the residual sum of squares for period 13. $\hat{\theta}_t(13)$ (which is the estimated t-th periodic element of the periodicity 13, t being

reduced mod 13, $(t=1, 2, ..., N)$) is arranged in a Buys-Ballot table for periodicity 15, $\hat{\theta}_{t.}(15/13)$ being its t-th column mean and $\hat{\theta}..(15/13)$ its general mean. If

$$\bar{z}_{t.}=\bar{x}_{t.}(15)-\hat{\theta}_{t.}(15/13) \text{ and } \bar{z}..=\bar{x}..-\hat{\theta}..(15/13), \qquad (t=1, 2, ..., 15),$$

then the between group sum of squares for the residual series is

$$\sum_{t=1}^{15} (\bar{z}_{t.}-\bar{z}..)^2 \, n_t(15).$$

The results are as follows :

total sum of squares	: 131212.40
between group sum of squares	: 46414.84

$$F(15/13) = \frac{46414.84}{84797.60} \times \frac{72}{14} = 2.0268.$$

This is not significant at the 0.01 point.

Hence if series 4 is at all periodic, it has one period, viz. 13. The Moving Average series (author's 5) has got only one period 11, and hence the problem of re-testing does not arise.

8.8.   Table 3 carries out the comparison between the optimum periodic and the optimum linear regressive fits.   Let p be the periodicity of the cyclical fit and k the order of the optimum autoregressive fit.   Then, we have to compare

$$\frac{\text{within column sum of squares for period } p}{\text{total sum of squares}} \times \frac{N-1}{p-1} \qquad ... \quad (8.1)$$

with

$$\frac{1-r^2_{k+1.k, k-1,..., 1}}{N-k}$$

where $r^2_{k+1.k, k-1,..., 1}$ is the multiple correlation coefficient of x_t and $x_{t-1}, x_{t-2}, ... x_{t-k}$. (Note that the abbreviation L. R. is used in the table to denote Linear Regressive Model.)

9. ILLUSTRATIONS : NATURAL SERIES

9.1.   Rules of action having been decided upon on the basis of analysis of the artificial series, we proceeded to apply our method to a number of observed series. The final results were published in the previous paper.   The most noteworthy feature in them is that our method does not seem to be biased in favour of any one of the types of processes: a fair number of series were obtained for each of them.   Due to lack of space, we have not been able to provide for examination by the reader all the diagrams; only a few, representing all the different types, are presented.   The most interesting feature of all these diagrams is that, except for a few (of which an example is diagram 17), the peaks of even those which have the most prominent peaks are hardly as large as those in the artificial cyclical series.   The obvious conclusion is that natural series are hardly ever periodic in the same clear-cut way as the artificial series are. This is quite in line with the idea in vogue that a natural series is less likely to have either

a purely continuous or a purely discontinuous spectrum than to have a mixture of the both.

9.2. Table 2 summarises in a self explanatory way the actions and decisions taken regarding the series on the basis of their F-diagrams. It is seen that the first four series are decidedly accepted as cyclical at the F-diagram stage. Of the rest, the next six have their diagrams entirely in region C, and are therefore decidedly accepted as linear regressive. The remaining twelve series have peaks in region B but not in region A. For these latter twelve series comparison has to be carried out between the Optimum Linear Regressive fit and the Optimum Linear Cyclical fit. This is done in Table 4. Those series which, on the basis of Tables 2 and 4, were thought to be Linear Regressive, were finally subjected to the test method of Rudra (1952) and the decisions as to their scheme are summarised in Table 5. A few series which should have been included in the Tables 4 and 5 are not there, as their serial correlations were not available to us.

9.3. An especially interesting case is Wolfer's Sunspots series (diagram 18). It is found by our method to be cyclical with periodicity 23. It is however well known that this data has a periodicity of length 11.5. As our method applies only to integral periodicities, we notice a peak at 23, and a minor one at 11, which latter vanishes on elimination of 23. It should be recalled that the series has lately been thought to follow an autoregressive scheme of order 2. In fact, we find that if the Sun-Spots series be subjected to the discriminatory test of Rudra (1952) we do decide on $AR(2)$, and the AR fit accounts for 81% of the variability while the periodic fit accounts for only 32%. Thus our present decision is wrong quite definitely. The reason why our method fails is that, the series, regarded as autoregresive, has a 'mean distance between upcrosses' of about 11.5. Thus, the series may also be regarded as genuinely periodic. Hence our decision, which agrees with that of Schuster, is understandable.

In conclusion I have to acknowledge my indebtedness to Dr. F. N. David of University College, London who helped me with preparation of this paper.

REFERENCES

DAVIS, H. T. (1941) : *The Analysis of Economic Time Series*, Bloomington Press, Indiana.
KENDALL, M. G. (1943) : Oscillatory movements in English agriculture. *J. Roy. Stat. Soc.*, **106**, 91.
———— (1946) : *The Advanced Theory of Statistics*, Charles Griffin, London.
———— (1949) : Tables of autoregressive series. *Biometrika*, **36**, 267.
PATNAIK, P. B. (1949) : The noncentral χ^2 and F-distributions and their applications. *Biometrika*, **36**, 202.
RUDRA, A. (1952) : Discrimination in time series analysis. *Biometrika*, **39**, 434.
———— (1954) : A method of discrimination in time series analysis. *Cal. Stat. Ass. Bull.*, **18**, 59.
SCHUSTER, A. (1906) : On the periodicities of sun spots. *Phil. Trans.*, A, **206**, 69.
TANG, P. C. (1938) : *Statistical Research Memoirs II*, 126. Dept. of Statistics, University of London.
WHITTAKER, E. T. AND ROBINSON, G. (1940) : *The Calculus of Observations*, Blackie & Sons, London.
WOLD, H. (1938) : *A study in the Analysis of Stationary Time Series*. Almquist & Wicksells, Uppsala.
YULE, G. U. (1927) : On a method of investigating periodicities in disturbed series, with special reference to Wolfer's sun spot numbers. *Phil. Trans.*, A, **226**, 267.

Paper received: December, 1953.

4

TABLE 1. SUMMARY OF THE ACTIONS AND DECISIONS TAKEN ON THE BASIS OF THE DIAGRAMS 1 TO 16

diagram no.	reference	description	length of series	periods which have peaks in region		periods subjected to retesting	result of retesting	decision
				A	B			
(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)
1	Kendall (1946)	M(10)* Ω(10) 44.44	60	10 20	none	20	not significant.	M(10)
2	author (1)	M(5,8,12) Ω(5) 132.50 Ω(8) 600.00 Ω(12) 34.02	120	5 8 16	10 25	10 16 25	not significant ,, ,,	M(5,8)
3	,, (2)	M(8,12) Ω(8) 600.00 Ω(12) 34.02	120	8 16 24	none	16 24	not significant significant	M(8,24)
4	,, (3)	M(8) Ω(8) 600.00	120	8 16 24	none	16 24	not significant ,,	M(8)
5	,, (4)	MA(1)§	100	none	none			L.R.†
6	,, (5)	MA(2)	100	none	11			M(11) or L.R.
7	,, (6)	MA(1)	100	none	none			L.R.
8	Kendall (1949) (1)	AR(2)‡	240	none	none			L.R.
9	,, (2)	AR(2)	240	none	none			L.R.
10	,, (3)	AR(2)	240	none	none			L.R.
11	,, (4)	AR(2)	100	none	13 15	15	not significant	L.R. or M(13)
12	,, (8)	AR(3)	200	none	none			L.R.
13	,, (10)	AR(3)	100	none	none			L.R.
14	,, (12)	AR(3)	100	21	none			M(21)
15	,, (14)	AR(3)	100	11	22	22	not significant	M(11)
16	,, (16)	AR(3)	100	none	7 14 21	14 21	not significant significant.	M(7,21) or L.R.

*M(a, b) :   Periodic Model involving two periods, a and b.

† L.R. :   Linear Regressive Model.

§ MA(a) :   Moving Average of older a.

‡ AR(b) :   Autoregressive of older (b).

TABLE 2. SUMMARY OF ACTIONS TAKEN AND DECISIONS REACHED ON THE BASIS OF F-DIAGRAMS FOR NATURAL SERIES NUMBERED 1 TO 22

series no.	diagram no.	reference	length	periods which have peak in region		periods subject to retesting	result of retesting	decision
				A	B			
1	17	weather Whittaker and Robinson (1940)	600	24 29				M(24,29)
2		egg Kendall (1946)	36	12				M(12)
3	18	Wolfer's sun spots Yule (1927)	176	23	11	11	not significant	M(23)
4	19	oats acres Kendall (1943)	65	24	12	24	significant	M(12,24)
5	20	cost of living index Wold (1938)	74					L.R.
6	21	Beveridge's wheat prices Kendall (1946)	370					L.R.
7†	22	cows	65					L.R.
8		horses	61					L.R.
9		potato acreage	65					L.R.
10	23	wheat yields	48					L.R.
11		oats prices	64		9			M(9) or L.R.
12		barley prices	64		13			M(13) or L.R.
13		oats yield	48		18			M(18) or L.R.
14		potato yield	48		24			M(24) or L.R.
15		barley acres	65		17			M(17) or L.R.
16		sheep	65		8 16 24	16 24	not significant not significant	M(8) or L.R.
17		wheat prices	64		9 19	19	not significant	M(9) or L.R.
18	24	wheat acres	65		9			M(9) or L.R.
19		pigs	65		13			M(15) or L.R.
20		barley yield	48		15			M(15) or L.R.
21		marriage Kendall (1946)	54		20			M(20) or L.R.
22	25	freight car loading Davis (1941)	168		12			M(12) or L.R.

† References to the series numbered 7 to 20 are the same as that of series 4.

TABLE 3. COMPARISON BETWEEN THE OPTIMUM CYCLICAL FIT AND THE OPTIMUM
LINEAR REGRESSIVE FIT WITH REGARD TO THOSE ARTIFICIAL SERIES THAT
HAVE PEAKS IN REGION B AND NOT IN REGION A

diagram no.	true model	optimum auto-regressive fit and the residual variance expressed as a proportion of the total variance	optimum periodic fit and the residual variance expressed as a proportion of the total variance	decision
6	MA(2) (author's 5)	AR(3) 0.57	M(11) 0.82	L.R.
11	AR(2) (Kendall's series 4)	AR(3) 0.37	M(13) 0.80	L.R.
16	AR(3) (Kendall's 16)	AR(3) 0.27	M(7,21) 0.68	L.R.

TABLE 4. COMPARISON BETWEEN THE OPTIMUM CYCLICAL FIT AND THE OPTIMUM
LINEAR REGRESSIVE FIT FOR THOSE NATURAL SERIES THAT HAVE PEAKS
IN REGION B BUT NOT IN A

series no.	series	proportion of residual variance to total variance of a cyclical fit	proportion of residual variance to total variance of a linear regressive fit	decision
12.	barley prices	0.68	0.61	L.R.
14.	potato yield	0.53	1.00	M(24)
15.	barley acre	0.69	1.00	M(17)
16.	sheep	0.75	0.26	L.R.
17.	wheat prices	0.78	0.55	L.R.
19.	pigs	0.73	0.65	L.R.
21.	marriage	0.62	0.39	L.R.

Series 11 and 18 are absent in the above table as it was not possible to find for them an optimum auto-regressive fit of reasonably small order.   Verdict should be in favour of the cyclical type in pursuance of the principle laid down in 6.3.

The serial correlations for series 13, 20 and 22 being unavailable, optimum linear regression fit for them could not be obtained, and hence they have also been excluded from the above table.

TABLE 5. DISCRIMINATORY METHOD OF RUDRA (1952) APPLIED TO THOSE SERIES
WHICH LIE ENTIRELY IN REGION C AND THOSE SERIES WHICH ON THE BASIS
OF TABLE 4 ARE DECIDED TO BE LINEAR REGRESSIVE

series no.	series	decision
5	cost of living	AR (2)
6	Beveridge's wheat prices	MA (1)
7	cows	MA (4)
9	potato acreage	MA (2)
10	wheat yields	random
12	barley prices	MA (1)
16	sheep	AR (2)
17	wheat prices	MA (1)
19	pigs	MA (2) [or AR (2)]
21	marriages	AR (4) [or MA (4)]
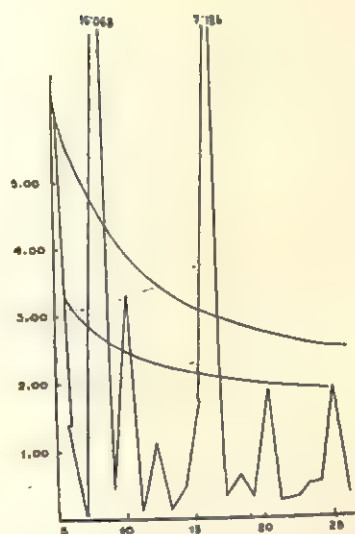
Diagram 2. Artificial cyclical series. Three periodicities : 5,8 and 12. (author)
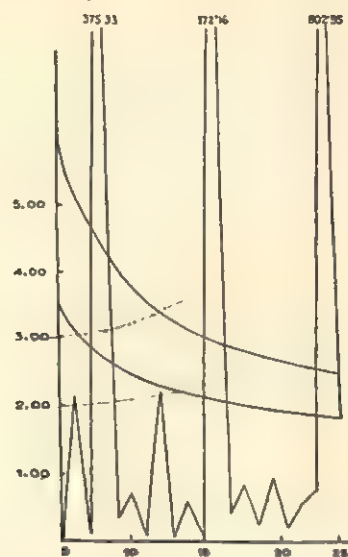
Diagram 3. Artificial cyclical series. Two periodicities : 8 and 12. (author)
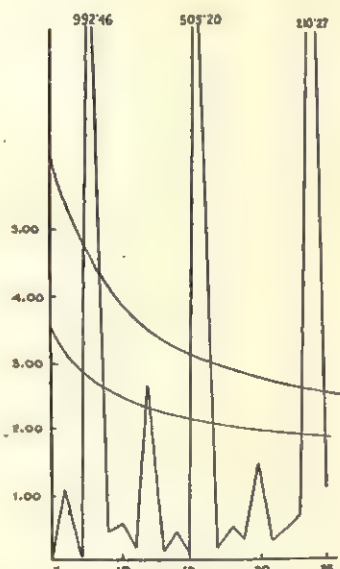
Diagram 4. Artificial cyclical series. One periodicity : 8. (author)
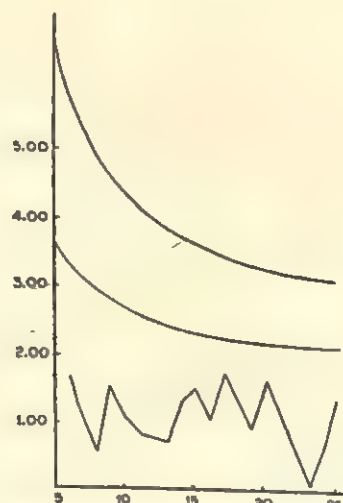
Diagram 5. Artificial moving average series. (author)
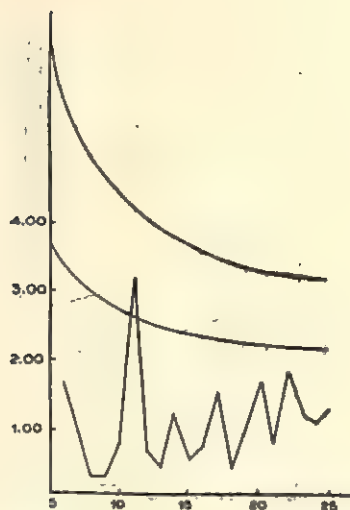
Diagram 6. Artificial moving average
series. (author)
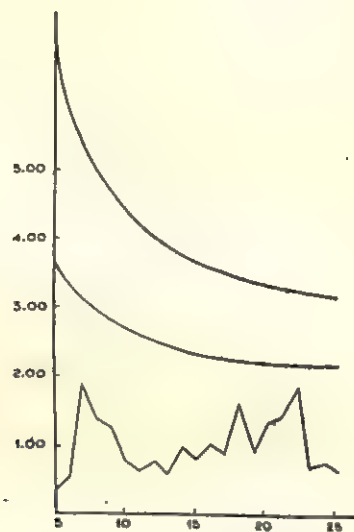
Diagram 7. Artificial moving average
series. (author)
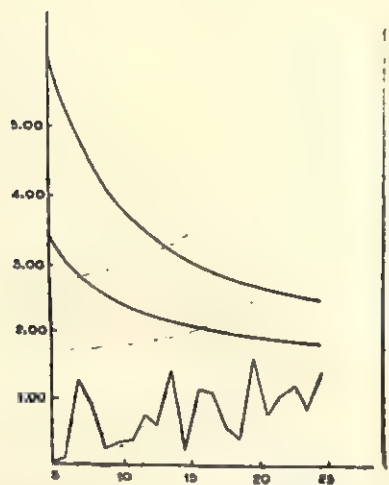
Diagram 8. Artificial autoregressive
series. (Kendall's 1).
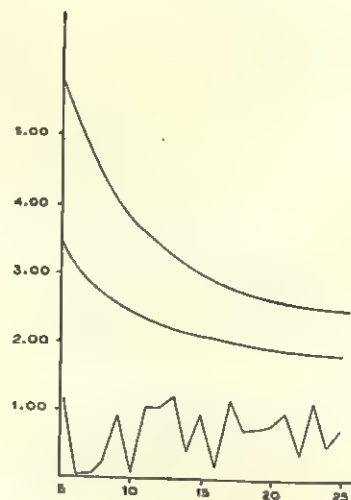
Diagram 9. Artipicial antoregressive
series. (Kendall's 2).
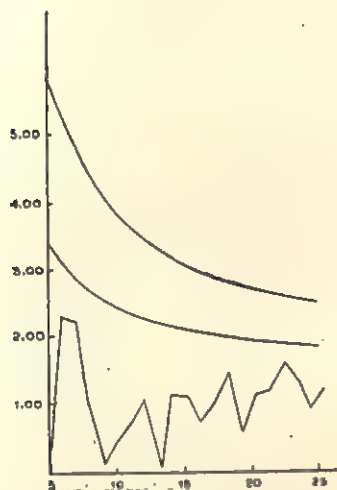
Diagram 10. Artificial autoregressive
series. (Kendall's 3).
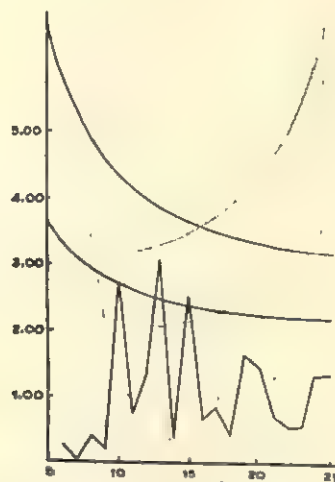
Diagram 11. Artificial autoregressive
series. (Kendall's 4).
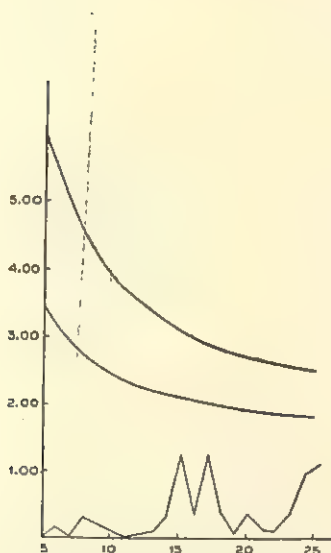
Diagram 12. Artificial autoregressiv
series. (Kendall's 8).
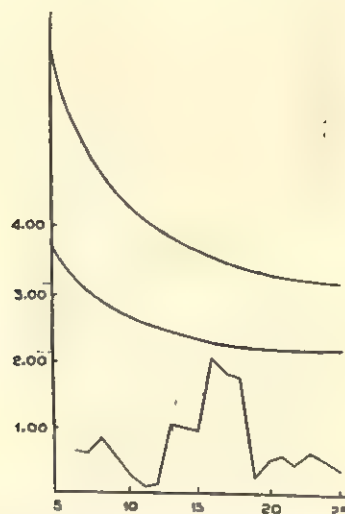
Diagram 13. Artificial autoregressive
series. (Kendall's 10).

31
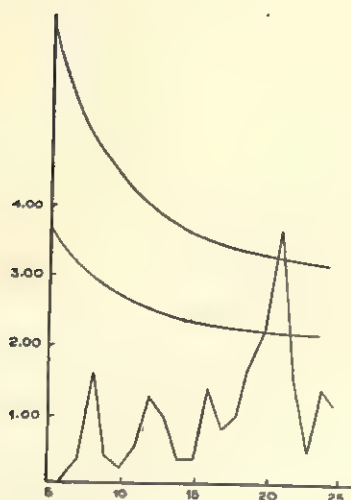
Diagram 14. Artificial autoregressive
series. (Kendall's 12).
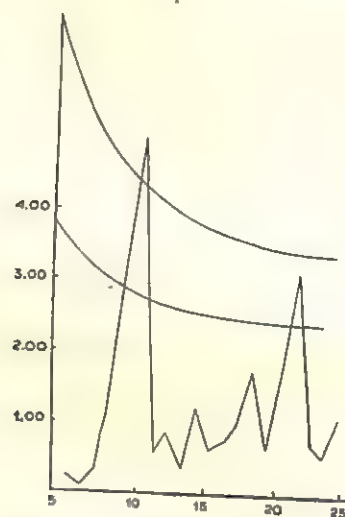
Diagram 15. Artificial autoregressive
series. (Kendall's 14).
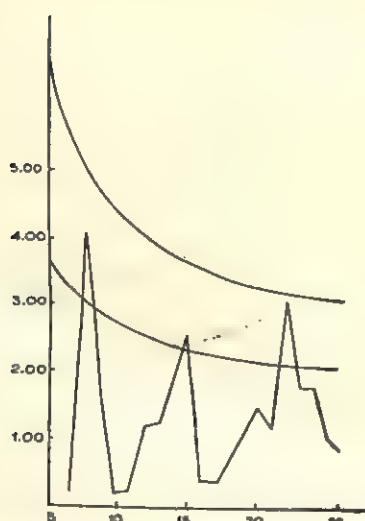
Diagram 16. Artificial autoregressive
series. (Kendall's 16).
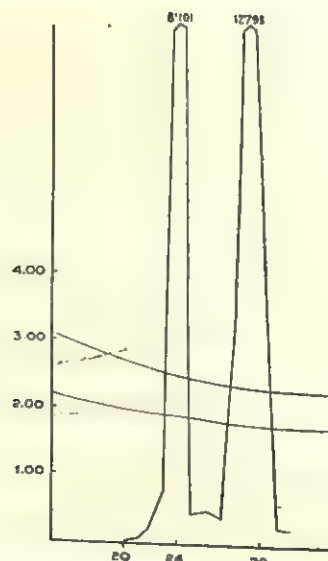
Diagram 17. Weather (Whittaker).
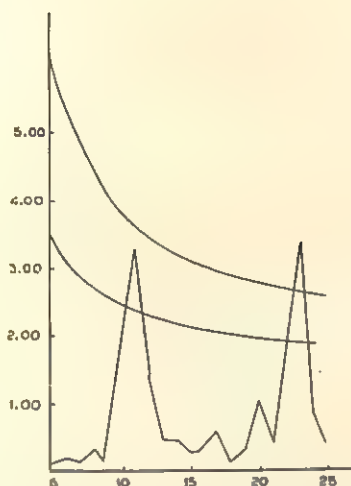
Diagram 18. Wolfer's sun spots. (Yule).
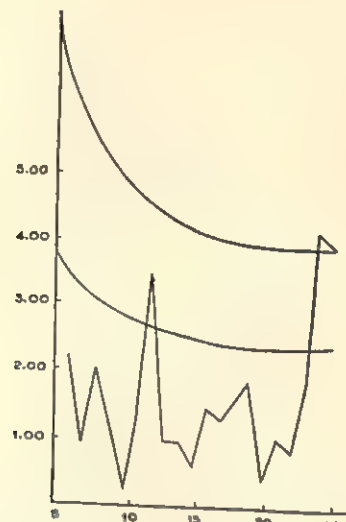
Diagram 19. Oats acres. (Kendall).
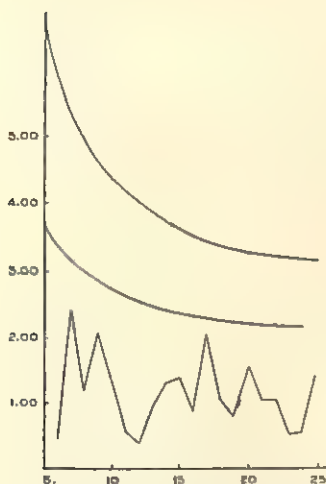
Diagram 20. Cost of Living. (Wold)
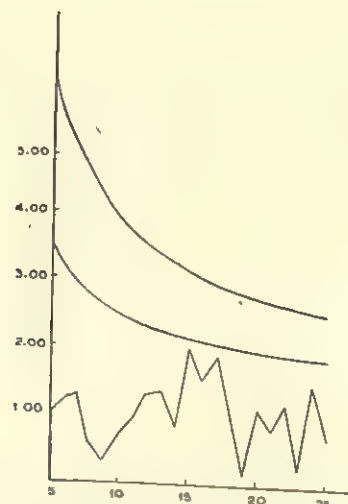
Diagram 21. Beveridge's wheat
prices (Kendall)

5
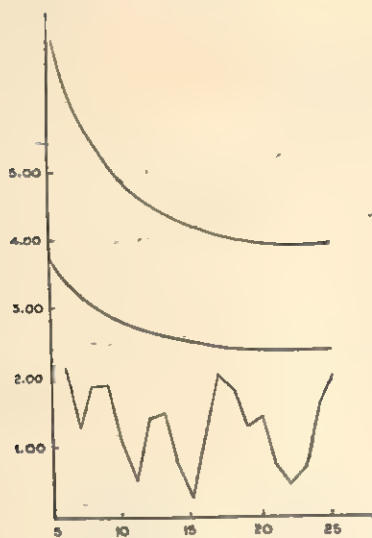
Diagram 22. Cows. (Kendall).
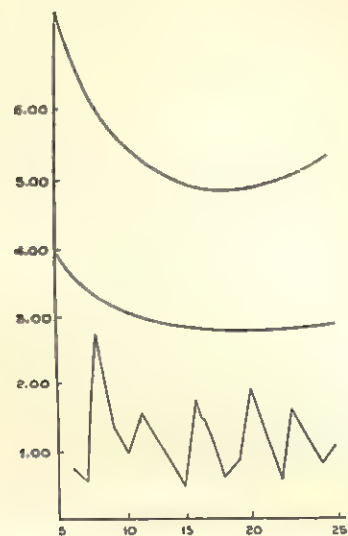
Diagram 23. Wheat yield. (Kendall).
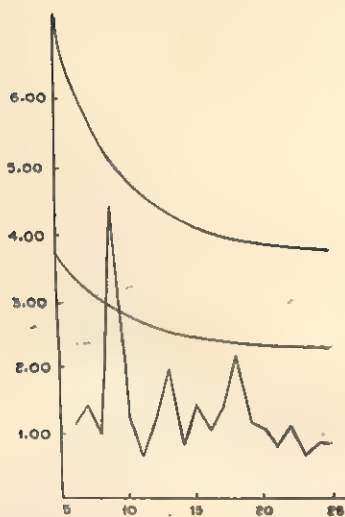
Diagram 24. Wheat acres. (Kendall).
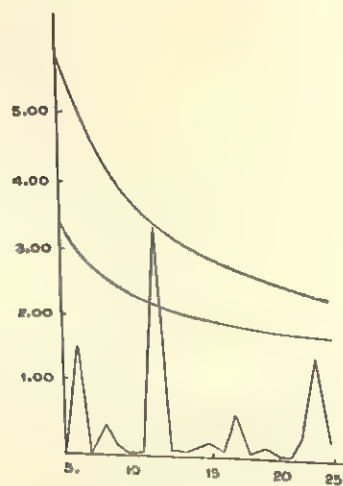
Diagram 25. Freight carloading. (Davis).

THE NATIONAL SAMPLE SURVEY

NUMBER 6

SURVEY OF FARIDABAD TOWNSHIP
March—April 1954

CONTENTS

INDEX TO TABLES IN THE TEXT.

CHAPTER TWO

CHAPTER FOUR

SURVEY OF FARIDABAD TOWNSHIP

CHAPTER FIVE

CHAPTER SIX

CHAPTER SEVEN

CHAPTER EIGHT

CHAPTER NINE

CHAPTER TEN

PAGE

THE NATIONAL SAMPLE SURVEY

NUMBER 6

SURVEY OF FARIDABAD TOWNSHIP
March—April : 1954

FOREWORD

In November 1953 Jawaharlal Nehru desired that a survey should be made of conditions at Faridabad where there was great distress among the refugees on account of unemployment. Accompanied by B. Ramamurti (Central Statistical Organization), Mani Mohan Mukherjee (National Income Unit), and Pitambar Pant (Private Secretary to the Chairman, Planning Commission) I went to Faridabad and made some preliminary enquiries on the spot.

2. We found a well laid out new town with a railway station, metalled roads, electricity, good water supply, and arrangements for health care and school education. A number of private enterprizes (including a fairly big Bata factory for shoes) had been established, but there were some difficulties which apparently were keeping off other entrepreneurs.

3. There was much unemployment among the refugees. Several hundreds were being taken by truck everyday to Delhi and other neighbouring places where they were working as unskilled labour in construction projects under the Central Public Works Department but this was only a temporary measure. Several hundreds more were being given "relief work", such as earth-cutting at Faridabad itself, which was more or less openly recognized as a kind of charity dole; it was not unnatural that the men did not take this work seriously. There was much distress and dissatisfaction.

4. After our visit to Faridabad we had some discussions among ourselves. We decided that the first thing necessary was a factual study of economic conditions, especially the unemployment situation, at Faridabad together with a general survey at old Faridabad to supply the contrasts between the old and the new town. A sample survey of households was, therefore, carried out in March 1954 under the direction of Pitambar Pant who has prepared the present report. He has given a full account of the survey about which it is not necessary for me to say anything.

5. I should like, however, to stress the importance of the detailed study of unemployment given in the present report. A two-category classification into "employed" and "unemployed" is entirely inadequate under Indian conditions. The present report supplies valuable information on the intensity of employment and earnings (in Chapter Ten), and also on the present and previous occupation and occupational preferences (in Chapter Eleven) which can be of great help in devising remedial measures.

6. The present report also supplies a great deal of information on the economic and social conditions and problems in a new industrial town. Economic development and rapid industrialization would necessarily mean the establishment of many new industrial towns in India in the near future. The present report would supply much guidance not only in organizing sample surveys in industrial towns but would be of great value in the planning of such new towns.

THE PRESENT FINANCIAL POSITION

7. I shall now turn to the broader problems at Faridabad beginning with a brief review of the present financial position. The capital expenditure incurred since the end of 1949 to the end of April 1953 was about Rs. 309 lakhs.[1] Adding about Rs. 6 lakhs as the expenditure in the following year the total capital expenditure at the end of March 1954 was perhaps about Rs. 315 lakhs (inclusive of the loan of Rs. 24 lakhs advanced to Indian Cooperative Union to organize industrial undertakings in the town). It is likely that capital expenditure (on water supply, power house etc.) of about Rs. 6 or 7 lakhs per year would have to be incurred for some time to come.

8. The township budget was about Rs. 22 lakhs in 1953-54[2] and is likely to be about Rs. 26 lakhs or so in future. The unemployment budget was Rs. 13 lakhs in 1953-54 (including cash doles to widows and orphans of about Rs. 4.90 lakhs). It is likely to increase to about Rs. 15 lakhs per year in the immediate future.

9. There are recoveries of about Rs. 4 lakhs per year on account of instalments of hire-purchase of houses, house-rent, electricity charges etc. The total amount of such recoveries are likely to increase with the improvement of economic conditions. Also, more important from the social point of view, the expenditure on relief works of about Rs. 10 lakhs per year is likely to decrease and ultimately vanish.

10. The financial position may be now briefly summarized. The total expenditure at the end of 1954 might have reached Rs. 320 lakhs ; and Rs. 6 or 7 lakhs per year are likely to be incurred in future. The current township budget would be probably of the order of Rs. 25 lakhs, and the cost of unemployment relief about Rs. 15 lakhs per year. The total recovery (capital and current) is at present about Rs. 4 lakhs per year. If, however, economic conditions improve, recoveries may increase by Rs. 6 or 7 lakhs ; and, also, the cost of relief works may decrease by Rs. 9 or 10 lakhs. The direct financial gain may thus come to something between Rs. 10 and Rs. 15 lakhs per year.

---

(1) *Details of capital expenditure (in lakhs of rupees)* : land 13.33, construction of 5000 houses 98.24, public buildings 11.10, construction of 80 shops 1.29, power house 40.14, roads 9.53, water supply 25.01, Nissen huts 3.69, railway siding 2.82, Technical Institute 17.88, tools and plants 2.10, establishment 14.43, bonus to workers 16.57, Bunglow plots 0.21, loan to Industrial Cooperative Union 24.00, stocks and works suspense 28.59; total Rs. 308.93 lakhs.

(2) *Details (in lakhs of rupees)* : Establishment 4.30, municipal 3.14, power house 7.00, medical 4.35, education 3.18; total Rs. 21.97 lakhs.

FOREWORD

THE OPERATIONAL PROBLEM

11. It is now possible to define the operational problem. It is clearly out of question (socially or politically) to abandon the township. There are only two possibilities. Either to continue as at present, or to take appropriate action to improve the economic conditions of Faridabad. The basic problem is to increase earnings by creating more and better employment. The only way to increase employment is to increase production by further investments. The first task is to make a rough estimate of the amount of investments needed to increase employment and earnings to the required extent.

12. An attempt was, therefore, made to collect some information about the enterprizes which are already working in Faridabad. Omitting the Central (Electric) Power House (which is a public enterprize with very heavy capital investment of over Rs. 16,000 per engaged person) it was found that the average rate of investment at Faridabad ranged roughly from about Rs. 4000 to about Rs. 9000, with an average of about Rs. 7000, per engaged person. Also, the average remuneration (inclusive of all grades of employees including management) was about Rs. 1700 per person per year giving a ratio of about 4.1 of average investment to average remuneration per person. Earnings varied from one enterprize to another and was generally higher in concerns with higher capital.

13. From Table 41 of the present report it is seen that about 3720 persons or 58.9% of the labour force have stable employment with an over-all average income of Rs. 82 per month. We may assume that no immediate action is needed in respect of persons with stable employment. We may also accept Rs. 82 as the standard average income per month per person in the labour force which we should try to provide for the remaining 2600 (41.1% of the labour force) who are either temporarily employed or without employment. About 780 persons on relief work, and about 530 unemployed or 1310 persons would have to be given new jobs with an average value of Rs. 82 per month; this would come to a total of Rs. 12.89 lakhs per year. In addition. there are 610 unskilled workers earning Rs. 28 per month whose remuneration would have to be increased by Rs. 54 per month per person on an average, or, to the extent of Rs. 3.95 lakhs per year. There are also 670 persons in temporary employment with average earnings of Rs. 13 per month whose income would have to be increased by Rs. 69 per person per month, or, by Rs. 5.58 lakhs per year. The total additional earnings required would thus come to Rs. 22.42 lakhs per year. If we use the ratio of investment to remuneration of 4.1 (as observed at Faridabad) the total investment required to generate Rs. 22.42 lakhs of new remuneration per year would be roughly Rs. 92 lakhs.

14. We have used a particular method of operational calculation. It is possible to adopt other approaches. But the basic data are meagre and there are so many uncertainties in the problem that it is not of much use to enter into refinements. The operational calculation indicates that new investments of the order of Rs. 90 lakhs or one crore of rupees, or, let us say, something between Rs. 80 lakhs and Rs. 110

lakhs would probably enable sufficient employment opportunities being created to raise average earnings of the whole of the labour force to about Rs. 82 per month (which is the target we have provisionally adopted).

15. In view of the fact that about Rs. 315 lakhs or so have been already invested at Faridabad, and also that the gain likely to accrue from improved economic conditions may come to something between Rs. 10 and Rs. 15 lakhs per year, it would be sound policy to bring about new investments of the order of a crore of rupees. This can be done either by starting new enterprizes in the public sector or by encouraging investments in the private sector by giving loans on suitable terms. .

16. This is as far as the present analysis can go. A further step, at a level of greater physical detail, would be to make enquiries about what particular types of enterprize would be most suitable for Faridabad. Such enquiries can be most conveniently taken up and would no doubt be taken up by appropriate agencies in the Government of India.

WIDER QUESTIONS

17. I may refer briefly to certain wider problems. The operational calculation given above has one severe limitation. New investments of a crore of rupees or so can solve the problem of unemployment at Faridabad only if there is sufficient demand for the goods (or services) which would be produced by such investments. If there is a general fall in demand then economic conditions might further deteriorate; and new investments of a crore or so locally at Faridabad would be of no avail. A more fundamental and permanent solution of the problem of unemployment at Faridabad can be attained only through the general economic development of the country as a whole which would ensure an expanding demand.

18. It is pertinent to recall in this connexion one significant finding of the present report, namely, that the average level of expenditure in old Faridabad is much lower than that in the new town. Per capita consumer expenditure in the new town is Rs. 23.5 per month which is about one-third higher than the per capita expenditure of Rs. 17.3 per month in old Faridabad. Large investments would clearly be needed to increase the standard of living of old Faridabad to the same level as that of the new town. The basic problem is country-wide and requires general economic development for its solution.

19. I may conclude this foreword by mentioning that it is intended to repeat a survey of the present type at Faridabad, if possible, in March 1955, to study the changes occurring in the interval of one year from the original survey. It is also intended to make similar sample surveys in other industrial towns. A survey would begin at Chittaranjan (the new town where the Chittaranjan locomotive factory is located) in December 1954. It is hoped that through such special and intensive studies in selected localities the National Sample Survey would be able to supply information of value for studies relating to planning for national development.

December 1954.   P. C. MAHALANOBIS

NATIONAL SAMPLE SURVEY

NUMBER 6

SURVEY OF FARIDABAD TOWNSHIP
MARCH—APRIL 1954

By PITAMBAR PANT

INTRODUCTION

1.1. This Report of the present economic condition of the population of Faridabad township is based on the data collected during March and April 1954 in the course of a sample survey of the township conducted at the desire of the Prime Minister.

1.2. Up-to-date list of all the households in the township was prepared towards the end of February 1954 and 500 out of a total of 5374 households in the township thus listed were randomly selected for investigation. Roughly, 1 in 11 households was thus included in the sample.

1.3. The information was collected by trained field investigators of the National Sample Survey whose services could be availed of for a period of nearly 2 months. During the entire period of the survey a team of 16 investigators, 3 inspectors and one supervisor stayed in the township. Each of the 500 sample households was visited by the investigators and the comprehensive schedules were filled in by skilfully interviewing the head of the household or other members, when necessary. These interviews seldom took less than 4 hours and sometimes considerably exceeded that duration. Furthermore, most of the households could be contacted only late in the evening when the earning members had returned home from work. Many of the investigators had therefore to be out on work till nearly midnight. Despite this, there was no lack of co-operation and it was possible to collect a great deal of detailed information on various aspects of the economic life of the people.

1.4.   An interesting feature of the survey was an investigation of the economic conditions in the neighbouring small town of Old Faridabad on similar lines to enable a comparative study being made.   Old Faridabad was selected for the purpose as its proximity made it possible for the investigating staff working in the new township to take up the additional work in their stride.   The purpose of the comparison is merely to present the economic facts of the new township against a background of conditions prevailing in some other area so as to help in understanding their proper significance.

1.5.   The work of the survey was so organised that the processing and analysis of data went on simultaneously with their collection and the Report in its present form was submitted to the Prime Minister on 18th July 1954.

CHAPTER ONE

FARIDABAD—A NEW TOWN

2.1. A large number of displaced persons from North West Frontier Province found shelter, after their migration from Pakistan in 1947, in the Kurukshetra camp along with many thousands from Punjab, Bahawalpur and other places, driven away from their homes in similar tragic circumstances during the upheavals preceding and following the Partition. For many months they stayed in the camp and depended on their sustenance either on gratuitous relief arranged by the government or on their own meagre resources. In the meanwhile, plans were drawn to take them out of the depressing and demoralising atmosphere of continued camp life and set them on the course of permanent rehabilitation in India.

2.2. The displaced persons from N.W.F.P. had a keen desire to start life in India in circumstances which would make it possible for them to preserve their own specific culture and traditions, keep their ties of kinship close and enjoy a community feeling which could come only if they were all enabled to stay together at one place. In February 1949, the Government of India accordingly decided to transfer about 25,000 displaced persons from N.W.F.P. and some others to Faridabad, on the site of a village on the Delhi-Mathura Road, 17 miles south-east of Delhi, in the Gurgaon district of Punjab where it was proposed to build a new township for them conceived on an ambitious scale and making use of modern ideas of town planning.

2.3. Originally the Punjab Government was entrusted with the setting up of a camp at Faridabad but the Government of India took over the administration in April 1949. In August 1949, a Development Board was set up under the Chairmanship of Dr. Rajendra Prasad to make arrangements for the construction of the township. When Dr. Rajendra Prasad became President of the Republic of India in January 1950, Shri H. N. Kunzru, M.P., was appointed in his place.

2.4. It was decided to finance the project through a loan of Rs. 250 lakhs from the Central Government to the Faridabad Development Board and the Board was to be in charge of implementing the scheme under the general supervision of the Ministry of Rehabilitation of the Government of India. The Board was expected to repay the loan in annual instalments of Rs. 10 lakhs beginning from April 1953.

2.5. The town is spread over an area of 7 square miles of which nearly half was acquired from eight villages, the owners being compensated by exchange of their land with other land situated in neighbouring villages in which there was evacuee property. Site clearance was done by military bull-dozers. The construction of houses began towards the end of 1950 and, within two years, more than 5,000 houses were completed. The plan of the township provides for five distinct neigh-

bourhoods and houses have been allotted in these neighbourhoods in such a way that persons belonging to the same district in N.W.F.P. are generally kept together. Each neighbourhood has 1200 to 1500 independent cottages of two rooms, kitchen, bath and lavatory. So far three of these self-contained neighbourhoods have been completed and the fourth has half its quota of houses ready. Each neighbourhood has also two primary schools, a shopping centre, a health centre and playing fields. The neighbourhoods have been built around an open area which is kept as a park for the township. There are 25 miles of well-constructed roads, mostly asphalted. The town is provided with street lighting, storm water drainage system and an excellent pipe water supply which is derived from tube wells. A power house has been built in the township with a generating capacity of 6000 kilowatt. Among the amenities of the town are a 150 bedded fully equipped modern hospital, a girls' high school, boys' high school and a well-organised system of preventive medical check up of the entire population. Primary education, based on the basic school system, is imparted under the supervision of the Nai Talimi Sangh, Wardha. Primary · as well as high school education are free and so are the arrangements for medical relief and prevention. A special feature is the provision of doles to widows who have none to support them. The township has a number of homes for them which are looked after by the Kasturba Sewa Sadan.

2.6.   A part of the town has been set apart as an industrial area from which sites are allotted to prospective industrialists. The industrial area has now the power house, the technical institute, the diesel engine factory, the Bata shoe factory and 16 other industries of various sizes. The Government of India Press at Simla is also due to be shifted to Faridabad and arrangements for the construction of quarters for the staff are under way.

2.7. Self-help and co-operation were the guiding slogans of the township in the early stages of its career. One of the significant achievements of the authorities who were responsible for the carrying out of the project was their success in persuading the displaced persons from N.W.F.P., most of whom had trade for their principal occupation in Pakistan, to shake off their reluctance to do manual work and to participate actively in building the town themselves. As the scheme progressed, they began to earn their livelihood out of the work of producing bricks, doors and windows, carrying stones from the quarry, doing earth work, building houses etc., thereby providing the labour necessary for the execution of the plan. This local effort had to be supplemented by only a small percent of skilled outsiders.

2.8. The Indian Co-operative Union, under the guidance of Shrimati Kamala Devi Chattopadhyaya, lent its helping hand to the Faridabad Development Board in the rehabilitation of displaced persons during the early stages of construction work by organising training in vocational persuits and by establishing light industries. In these efforts the Union received financial help from the Government in the form of loans made to it by the Development Board out of funds placed at the disposal of the Board by the Government. About 40 co-operative societies were brought

into existence including motor transport (14); animal transport (1); brick kiln (9); blacksmithy (3); painting (1); carpentry (1); weaving (1); tailoring (1); dairy (2); consumers' store (5). Three out of four of these societies were organised to carry on work of one kind or another in connection with the constructional activities in the township.

2.9. The building programme, however, more or less, came to an end in 1952 and as the development of the industries was far behind expectations, the Faridabad Board was faced with a serious situation of growing unemployment. Most of the co-operative societies also ceased to have any work and the members found it hard to earn a living. Their future was thrown in the melting pot and few of the societies ultimately survived. The Indian Co-operative Union itself withdrew from Faridabad in 1952, not seeing eye to eye with Government regarding its policy.

2.10. To tide over the immediate difficulties, arrangements were made for a few hundred to be employed in the Central Public Works Department at Kalkaji, Malviyanagar and other neighbouring places, but it was recognised that it could only be a short term measure. Moreover, the transport of workers from Faridabad to Kalkaji and other places, a distance of nearly 12 to 15 miles has to be done at a considerable cost to Government out of relief funds. A large number of persons had also to be provided relief work in Faridabad itself just to afford them a means of livelihood.

2.11. At present the affairs of Faridabad are being directly looked into by the Ministry of Rehabilitation. The Faridabad Development Board has practically ceased to function.

2.12. During recent months concerted action has been taken to attract private industries to Faridabad. They have been offered various concessions including financial assistance for starting their enterprises in the township. The response of industry has been encouraging and already negotiations have been completed with a few parties which will result in the setting up of new industries in the town, opening thereby much needed avenues of employment.

CHAPTER TWO

OBJECT, SCOPE, DESIGN AND CONDUCT OF THE SURVEY

OBJECT OF THE SURVEY

3.1. The provision of continued gainful employment of the workers in Faridabad has been, as already noted, a source of considerable worry to the Faridabad Development Board and to Government. The building programme having been completed nearly two years ago and industrial development not having kept pace to the extent hoped for, the opportunities for satisfactory employment in the township itself have been far short of the need. That there has been acute unemployment in the township has been generally recognised but unfortunately very little information of sufficient reliability is available which can give a clear insight into the nature and extent of the problem and reveal how the people in Faridabad are living and maintaining themselves. The difficulties of those concerned with the affairs of Faridabad have been increased due to the indefiniteness of information regarding the dimensions of the problem. The following assessment from an official note submitted to the Minister of Rehabilitation in June 1953, summing up the unemployment situation in Faridabad, illustrates the above point :

"The employment position of Faridabad at the end of May 1953 was as follows :

employable persons	5097
employed on permanent work	2717
employed on temporary work	1364
unemployed	1016

The present Administrator is however of the view that the number of employable persons in Faridabad is 9000. He thinks that on an average there are 2 employables in each family. If this estimate is taken into consideration suitable employment is to be found for about 6000 persons instead of 2500 hitherto estimated".

3.2. It is thus left to any one's guess to make his own estimate of the unemployed in Faridabad within a range of 2500 to 6000. Even in regard to the population of the township varying estimates have been put forward ranging from 23000 to 26000. This obviously could not be considered a satisfactory situation.

3.3. The sample survey of 500 households has been carried out with the object of collecting information on

(a) population of Faridabad (separately in households registered for rehabilitation in the township and households not so registered);

(b) sources of livelihood of the population;

(c) nature and extent of unemployment; and

(d) level of living of the population.

SURVEY OF FARIDABAD TOWNSHIP

THE SCOPE OF THE SURVEY

4.1. For collecting detailed information from the households a comprehensive schedule was used which mostly followed the pattern of the schedules used in the National Sample Survey except for such adaptations and additions as were considered appropriate for the purpose of the present enquiry. Concepts and definitions were the same as are in vogue in the N.S.S.

4.2. The schedule can be divided into the following main sections :

4.2. 1. *Demographic particulars* to be collected for each member of the household pertaining to relationship to the head of the household; registration with Faridabad Development Board for resettlement in the township; details of migration; length of stay in Faridabad; sex; age last birthday; marital status; standard of general education and technical qualification; language; economic status (i.e., whether earner, earning dependent or non-earning dependent); industrial status (i.e., whether employer, employee, own account worker; unemployed or not in labour force).

4.2. 2. For migrant households information was also sought regarding the occupation of the household in Pakistan from which it derived the major portion of its income.

4.2. 3. *Employment particulars* during the three months December 1953–February 1954, a total period of 90 days, to be collected for every person who was engaged in any principal or subsidiary occupation at any time during this period. In respect of both principal and subsidiary occupation of each earner and earning dependent information was noted as to his occupation; source and location of employment; days of employment during each of the three months and the net income from service or enterprise for each month separately. An attempt was also made to piece together the history of employment of the earners and earning dependents over the entire period of their stay in Faridabad. This portion of the schedule was designed to collect information as to the industrial status, occupation, average monthly income and how maintained in the form of a continuous record.

4.2. 4. *Consumer expenditure pattern* to be ascertained with reference to the month of February 1954 for all households. The schedule condensed the 353 items listed in the NSS schedule to 33 only without disturbing comparability. Both quantity and value were to be noted for all food items (except beverages and refreshments) and only value for other items of consumption. Purchases made from vendors and fixed shops of residents and non-residents of Faridabad were to be noted separately. Columns were provided for recording the quantities and values of items consumed out of home supply and total consumption made during the reference period. The expenditure of the household during the preceding one year was also noted for durable and semi-durable goods such as clothing, footwear, furniture and utensils etc.

4.2. 5. *Income and receipts* of the household during the month of February 1954 from different sources such as, occupation; government doles; home produce

(milk, fuel etc.); gifts and remittances; past savings; sale of assets; loans and any other sources not specified above. For one sub-sample a detailed schedule of incomings and outgoings during the preceding year was used in an effort to study this aspect in more detail.

4.2.6. *Enterprise particulars* to be recorded in accordance with the NSS classification of enterprises, such as agriculture and animal husbandry; small scale household manufacture and handicraft; transport; trade; and professions, services and financial operations. For each enterprise the schedule was specifically designed to collect data on sources of earning, items of cost, production and sales and inventory in a form appropriate to it.

4.2.7. *Health, housing and miscellaneous* seeking information regarding births and deaths during the year ended February 1954; sickness—their cause and duration—during the three months December 1953–February 1954; housing and sanitation; claims and compensation; occupational preference.

4.3. Numerical codes were prescribed for recording the information to avoid vagueness and for the sake of compactness.

Design of the Survey

5.1. The first point considered was whether the individual person or the individual household should form the basis of sampling. Many of the characteristics to be surveyed, such as, age, sex, education standard, economic and employment status, nature of employment and monthly income pertain to the individual; but, there are many others, descriptive of economic conditions, which relate to the household as a unit rather than to the individual. A sample based on individuals would be more suitable for the first category of information, but may be less accurate for others. On the other hand, the household would provide a more adequate basis for sampling for obtaining information concerning the characteristics of the household such as size and composition; household's earning strength, principal occupation, monthly income and pattern of expenditure. On a balance of all considerations and keeping in view the variety of information proposed to be collected in the survey and the practical consideration of field work, the household was adopted as the unit of sampling (as in the NSS).

5.2. *Sample selection* : The material from which the samples were drawn consisted of an up-to-date list of all the 5374 households in Faridabad township which was prepared before the survey was started by a band of unemployed matriculates of the township who were appointed on an ad hoc basis for the assignment. For each household the name of the head of the household, the location of the household in terms of neighbourhood, block and house number were recorded and also the principal occupation of the household. As the listing was done by workers who belonged to the area and were conversant with the locality and the people and every tenth household in the list was checked by NSS inspectors, a fairly high level of

accuracy was attained which was confirmed in the course of the field investigation when in less than one percent of cases, the investigators came across a wrongly listed household. This up-to-date list thus served as a dependable frame for sample selection.

5.3. The listed households were classified into six occupational groups as follows :

1) no productive occupation
2) unskilled work
3) skilled technical work
4) administrative and executive work
5) services and professions and
6) distributive trades.

5.4. The households were numbered serially within each occupation group from which they were selected at random, proportionate to the total number of households in each group. The full sample consisted of 500 households but selection was made in 5 separate sub-samples of 100 households each. Sampling was done without replacement so that any household once included in any sub-sample was not repeated in other sub-samples. Each sub-sample was capable of giving valid representative estimates for the entire population. The stratification by occupation ensured proportionate representation of each group even in the sub-samples.

5.5. The following table shows the number and percentage of households in the population in the different occupation groups and number selected for each sub-sample :

TABLE 1 : NUMBER AND PERCENTAGE OF HOUSEHOLDS BY OCCUPATION GROUPS, IN THE POPULATION AND IN THE SAMPLE

occupation group	households in the population		households in any sub-sample	households in full sample
	number	percent		
no productive occupation	849	16	16	80
unskilled work	1800	33	33	165
skilled technical work	1050	20	20	100
administrative & executive work	685	13	13	65
services and professions	482	9	9	45
distributive trades	508	9	9	45
total	5374	100	100	500

5.6. A sixth sub-sample of 100 households was selected in the same way with the limited purpose of studying in detail the incomings and outgoings of households during one month and one year.

5.7. In a survey of this size, it could be expected that in a few cases the investigator might not be able to establish contact with the household assigned to him for survey. This could happen due to various reasons : wrong address; absence of informant from his house in the township for a long or short period; absolute refusal of an informant to give information. Every attempt is made to keep these 'casualties' to a minimum. Effort is made to establish the identity of a household even if the address is sometimes recorded wrongly. If the informant is found absent from his house, he is visited again. Patience and tact are put to the fullest use for reassuring the recalcitrants and bringing them round to co-operate. But still the process has its limits and the planners of the survey have to reconcile themselves to a certain number of unavoidable casualties. These missed households in this survey were replaced by extra households within the same occupation group randomly selected from the very outset.

Field operations

6.1. The field work was conducted by the trained staff of the Directorate of National Sample Survey consisting of a team of 16 investigators, 3 inspectors and 1 supervisor whose services were secured for a period of two months during the gap between the seventh and eighth round of the normal NSS operations. This unusually large gap was due to the postponement of the NSS field work by a few weeks in order to complete the extensive preliminary preparations in connection with the all-India sample survey of land holdings which is proposed to be integrated with the NSS eighth round.

6.2. *Listing of households*: The Development Board has a record of information about individual households on, what are called, family index cards. An examination of this material revealed that information contained therein was often incomplete and mostly old and out of date. For selecting the sample households it is necessary to have a dependable 'frame'. The National Register of Citizens of Faridabad was equally unsatisfactory for the purpose as the information was three years out of date and it was known that during this period at least 800 persons had left Faridabad and 900 had arrived. It was accordingly decided to prepare an up-to-date list of all the households in the township giving the location of the household, the name of the head, the principal occupation of the household and whether it was registered or not. Under the supervision of the supervisor and 2 of the 16 NSS Investigators whose services were available from 23 February 1954, the work of complete enumeration of all the households was started on 24 February 1954 by nine unemployed matriculates of Faridabad who were put on this work on an ad hoc basis. One-tenth of all the households were checked by the supervisor and the NSS investigators which served to increase the accuracy of the lists. The listing of 5374 households took a week and was completed on 2 March 1954. The services of the ad hoc staff were then dispensed with.

6.3. *Training of field staff* : 14 other investigators and three inspectors of the Directorate of National Sample Survey reported for work in connection with the survey on 5 March 1954. While the samples were being drawn on the basis of the household list which was completed on 2 March, according to the design already described, intensive training was given to the field staff for two days in New Delhi in the course of which concepts, definitions and codes for recording the information were thoroughly discussed and fully explained with reference to each item in the schedule.

6.4. *Arrangements for work in Faridabad* : The training over, the field investigators and supervisory staff proceeded to Faridabad, where already arrangements had been made for their stay in four cottages very kindly placed at their disposal, on a rental basis, by the authorities of the Faridabad Development Board. The authorities of the Board were good enough to provide some office accommodation also.

6.5. This arrangement of all the investigators and supervisory staff staying at one place during the entire period of the survey had many advantages. It made possible the immediate, on-the-spot removal of difficulties which could be referred to the supervisory staff by any investigator faced with any doubts or problems. Mutual discussions, which were long and frequent, helped clarification of ideas and ensured common approach. Not less important, it made for community living and even two months of continuous field investigation left little trace of strain.

6.6. *Field work* : The actual field work started on 8 March. Each investigator received as his share 6 or 7 schedules to be completed for each sub-sample. As the filled schedules were received from the field, the inspectors scrutinised them and any mistakes or omissions were brought to the notice of the concerned investigators. The corrected schedule was again looked into by the inspector before it was sent on to Delhi for analysis. The surprise checks often conducted by the supervisor did not permit laxity on the part of investigators and ensured a comparatively high level of quality of the returns. The help of inspectors and the supervisor was also freely available to the investigators for tackling any difficult household. The supervisor and inspectors in their turn took every opportunity to resolve their own doubts by consulting the persons concerned with the conduct of the survey at Delhi. The proximity of Faridabad rendered this course feasible to a much larger extent than is usual in such field enquiries and was an important factor in the satisfactory conduct of the investigation.

6.7. Contacting of households was beset with difficulties. Very few of the households could be visited for interview during the day time when the earning members were out on work. A preliminary visit was required in most cases to fix a subsequent appointment for the interview, suiting the convenience of the informant. The time could be early in the morning or after sunset in the evening. The interviews, when they came, seldom took less then four hours and very often more. Cases were not rare when the investigator returned to his camp past midnight after filling up a schedule.

6.8. The extended area of the township, which is scattered over seven square miles, and lack of any suitable communications left the investigators little choice but to foot the distances away from one end to another on track of sample households which were assigned to them at random.   This was tiring and time-consuming.

7.1. *'Casualties'* : The informants on the whole were co-operative and in some cases where there was initial resistance, it was overcome by tact and persuasion on the part of the investigator or the inspector.   Still the informants of 2 households remained adamant in their non-cooperation and they had to be written off as 'casualties' to be replaced by substitute households from the same occupation group, randomly selected from the outset to meet the contingency.

7.2. Casualties also occurred when a particular household was found to have gone away from Faridabad for a long or short duration, or when a particular household could not be traced, which happened only in very few cases.   Unavoidable casualties were replaced with substitute households as mentioned above.   Altogether there were 25 casualties in all the six samples, representing a proportion of about 4% of the total households.   Every 'casualty', as soon as reported by the investigator, was thoroughly investigated by the inspector by enquiry on the spot and it was only when it was established that there was no chance of contacting the household within reasonable time, that the substitute household was given for it.   The 25 casualties were due to the following reasons :

informant temporarily away from Faridabad	18
informant untraceable-wrong listing	5
informant's refusal to give information	2
	25

8. In all 600 schedules were completed, out of which 500 constituted the main sample and a sub-sample of 100 was investigated with the limited purpose of getting a clear idea of the incomings and outgoings of the households during the course of one year.   The scrutiny of some of the schedules of the first sub-sample, which served somewhat as a pilot project, suggested new items to be incorporated in the schedule which was amended in some particulars.   The changes held good for all subsequent sub-samples, but they required revisits to such of the households in the first sub-sample for which data had been collected on the older form and needed to be supplemented. Taking into consideration these revisits to about 70 households, the average outturn of an investigator could be estimated on the basis of 650 schedules completed by 16 investigators in the course of 48 days, 8 March—when the field work started—to 24 April, when it was completed.   This gives an average outturn of about five-sixth of a schedule per investigator per day (gross).

PROCESSING AND ANALYSIS OF STATISTICAL DATA

9.1. *Technical scrutiny* : After being checked by the inspectors, the schedules were received in the statistical section of the survey staff at New Delhi and were sub-

jected to close scrutiny for a second time. Obvious mistakes of coding or of arithmetic were corrected and doubtful entries in the schedules were referred back for explanation to the field.

9.2. *The processing and analysis of the data* went along simultaneously with the field work. By the time schedules relating to the last sub-sample were received from the field, processing and analysis of the material collected in the first, second and third sub-samples had reached an advanced stage.

9.3. As each sub-sample was capable of furnishing independent and valid estimates, a fair idea of the results likely to be obtained on the basis of the full sample of 500 households, could be had far in advance of the completion of field work. Such knowledge helped in planning a uniform set of tables for each sub-sample which were ultimately pooled for all the five samples to give the set of statistical tables forming part of this Report.

9.4. As we have a proportionate sample with a uniform sampling fraction for each stratum the estimate of the mean for any sub-sample is merely the simple unweighted mean of all the households included in the sample.

9.5. The processing and analysis of data and compilation of tables was completed by the third week of June by a group of six workers who did all the work manually. This task entailed about 20 man-months of work.

9.6. The writing of this Report was undertaken towards the end of June and was completed in two weeks.

Uncertainty of estimates

10.1. If we were to set about collecting the information we have gathered in our survey not by visiting just the sample households (selected by methods which permit the use of the theory of probability)—representing only a small fraction of households— but extended our enquiry to each and every household asking them the same questions in the same manner and using the same type of staff for this formidable venture, we may be sure that the values obtained would be different from the estimates furnished by the sample survey. The important question is whether the difference between the sample result and the result of a complete count taken under the same conditions is small enough for the purpose of our study. This difference is a measure of the 'uncertainty' of the sample result and it is one of the remarkable features of the sampling method that a measure of this uncertainty can be obtained from the sample itself without knowing the true value being estimated.

10.2. The design of the present survey which has been conducted in 5 independent sub-samples permits a comparison between the results obtained from each of the 5 sub-samples, thus giving an idea as to the error that may be expected on the average for an estimate based on a single sub-sample or the full sample.

10.3.   Table 2 gives for a number of characters the values obtained from each of the 5 sub-samples, their mean and standard deviation and shows a very close correspondence between values obtained from the five sub-samples.

10.4.   In a multipurpose survey of this nature the 'uncertainty' (or lack of precision) of different estimates must differ from one another. The idea of precision attained in the present survey in the case of two important items of information may be had from the following:

population of Faridabad township	
March 1954 (in 000)	23.84 ± .22
consumer expenditure per household	
February 1954 (in rupees)	104.3 ± 2.0

The estimates have been given together with their mean error. The mean error for the population estimate is 0.9 percent and for consumer expenditure per household 1.9 percent.

11.1.   *Non-sampling errors* : The 'uncertainty' may not, however, be considered synonimous with the 'inaccuracy' of the results if by inaccuracy is meant the difference between the sample result and the true value. The non-sampling errors that arise from the method of measurement or interviewing or are due to the general tendency on the part of informants to give distorted information, may be as important as sampling errors. They are, however, not reduced by replacing sampling by complete census and in fact are likely to play a more important role in the latter case because of the difficulty of ensuring a higher quality of work if conducted on such large scale and with necessarily lower qualified personnel.

11.2.   If independent checks were available, it would be possible to get an idea of the non-sampling errors of the survey. Unfortunately, in most cases such data are not available. Where available we have made a comparison between them and the corresponding estimates obtained from the survey. One such comparison is given here.

11.3.   The birth and death data in Faridabad township are supposed to be of high accuracy. The number of births and deaths as obtained from the records of Faridabad medical authorities and as estimated from our survey for the whole population for the corresponding period (March 1953 to February 1954) are given below and show very good agreement :

		Faridabad records	sample survey estimates
births during one year	(00)	6.2	6.5
deathsduring one year	(00)	2.4	2.5

TABLE 2 : SOME SUB-SAMPLE VALUES TOGETHER WITH THEIR MEAN AND STANDARD DEVIATION

sl. no.	item of information	sub-sample values					mean	standard deviation
		1	2	3	4	5		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	households migrated (proportion)	0.94	0.95	0.96	0.96	0.97	0.96	±0.01
2	households not registered (proportion)	0.13	0.14	0.12	0.10	0.07	0.11	±0.03
3	average household size	4.38	4.48	4.36	4.41	4.55	4.44	±0.08
4	per household number of							
	(i) males	2.07	2.31	2.13	2.10	2.29	2.18	±0.11
	(ii) females	2.31	2.17	2.23	2.31	2.26	2.26	±0.06
5	age distribution : per household							
	(i) infants : − 0	0.09	0.14	0.10	0.14	0.07	0.11	±0.03
	(ii) children : 1–4	0.39	0.51	0.47	0.44	0.56	0.47	±0.07
	(iii) boys and girls : 5–14	1.29	1.21	1.34	1.32	1.30	1.29	±0.05
	(iv) young men and women 15–34	1.54	1.46	1.46	1.46	1.49	1.48	±0.04
	(v) middle aged persons : 35–54	0.63	0.77	0.66	0.65	0.80	0.70	±0.08
	(vi) elderly persons : 55–	0.44	0.39	0.33	0.40	0.33	0.38	±0.05
6	educational standard : persons per household—							
	(i) illiterate	1.92	2.06	1.61	2.02	1.78	1.88	±0.18
	(ii) literate but not middle	1.99	1.99	2.22	1.92	2.30	2.08	±0.17
	(iii) middle but not matric	0.32	0.25	0.36	0.35	0.34	0.32	±0.04
	(iv) matric and above	0.15	0.18	0.17	0.12	0.13	0.15	±0.03
7	industrial status : persons per household—							
	(i) working	1.01	1.12	1.07	1.08	1.13	1.08	±0.05
	(ii) seeking employment	0.12	0.08	0.08	0.11	0.11	0.10	±0.02
	(iii) not in labour force	3.25	3.28	3.21	3.24	3.31	3.26	±0.04
8	economic status : persons per household—							
	(i) earners	1.18	1.21	1.15	1.13	1.19	1.17	±0.03
	(ii) earning dependents	0.14	0.12	0.10	0.20	0.20	0.15	±0.05
	(iii) non-earning dependents	3.06	3.15	3.11	3.08	3.16	3.11	±0.04
9	expenditure levels : proportion of households in expenditure level in rupees per month—							
	(i) −50	0.17	0.15	0.13	0.20	0.13	0.16	±0.03
	(ii) 51–100	0.47	0.42	0.44	0.36	0.49	0.44	±0.05
	(iii) 101–150	0.21	0.24	0.24	0.27	0.24	0.24	±0.02
	(iv) 151–	0.15	0.19	0.19	0.17	0.14	0.17	±0.02
10	average receipts per household in rupees per month	131.5	122.3	113.1	116.1	121.0	120.8	±7.0
11	consumer expenditure per household in rupees per month	104.1	111.2	104.8	102.1	99.1	104.3	±4.5

CHAPTER THREE

SURVEY RESULTS

INTRODUCTION

12.1.   The information collected in the course of the survey has been compiled in the set of Tables which come at the end of this Report.   A good deal of information is compressed in the Tables which are self-contained and are capable of telling their tale without outside assistance.   It is not, therefore, proposed to take the reader from table to table, column by column through all the figures.

12.2.   In the following Chapters we propose to explain the concepts and definitions used in the survey and give a connected account of facts in simple language and without taking recourse to frequent references to Tables at the end.   Of course, the information presented in these Chapters is mainly derived from the Tables but an attempt has been made to avoid obvious repetition and even where the information is the same, it has been presented in different form.   The main effort has been to discuss the results of the survey in such a way as to present an integrated picture of the economic conditions in Faridabad and to bring out any special features by appropriate comparisons.

12.3.   Chapter Four, which follows, begins with an introduction of the population of the township.   It tells about the registered and unregistered households, their proportion in the population, from where and when they came to Faridabad; their size and structure; their similarities and differences.   It proceeds to analyse the population by sex, age, marital status, educational attainments and mother tongue, ending up this brief introduction by an up-to-date estimate of the total population of the township.

12.4.   Chapter Five discusses the shifts in the pattern of occupation of the migrant households and is followed by Chapter Six which proceeds to a detailed consideration of the earners and earning dependents and their relative role in the economy.   Then follows in Chapter Seven an analysis of the labour force, describing its composition, by sex, age, educational and technical qualifications and including estimates for the township.

12.5.   The principal and subsidiary occupations of the gainfully occupied persons have full Chapter Eight for their consideration and the women earners have received independent attention in Chapter Nine.

12.6.   Next comes the important Chapter Ten on the nature and intensity of employment where an effort has been made to give the dimensions of the problem of unemployment and underemployment.   The importance of the problem of unemployment has received further recognition in Chapter Eleven which is devoted solely to the description of the unemployed, who they are, of what age, their past occupation, if any, and the type of households to which they belong.

12.7. After this description of the economic activities, attention is focussed on the pattern of consumer expenditure of households in Chapter Twelve. How this expenditure is met by the households is discussed in the next Chapter Thirteen. Then follows Chapter Fourteen giving some interesting results relating to vital events and morbidity and ending with a description of the housing and sanitation in the township.

12.8 The survey results can be easily read through without even referring to the Tables at the end of the Report but in case it is desired to follow up a particular point, fuller information can be obtained from the Tables. For facilitating such reference, the tables in the text in subsequent Chapters carry along with their number, within brackets, a reference to the relevant Tables, which latter may be grouped according to the type of information as follows :

	type of information	table numbers
1	particulars of migration	1.1-1.5
2	demographic	2.1-2.4
3	occupation of migrant households in India and Pakistan	3.1-3.3
4	economic status	4.1-4.5; 6.1-6.12; 7.1-7.7
5	labour force and industrial status	4.3-4.5; 5.1-5.9; 6.5-6.12; 7.5, 7.8
6	principal and subsidiary occupation	6.1-6.12
7	nature and intensity of employment	7.1-7.8, 8.1
8	the unemployed	8.1-8.6
9	consumer expenditure	9.1-9.6
10	source of receipts	10.1, 10.2
11	births, deaths and sickness	11.1-11.4
12	housing	12.1
13	comparison of subsamples	13.1, 13.2

SUMMARY OF MAIN RESULTS

13.1. Before we pass on to a detailed discussion of the results of the survey in the Chapters that follow we may summarise the main results.

13.2. *Demographic*: The population of the Faridabad township is 23.8 ($\pm$.2) thousand comprised of 5.4 thousand households, of which 4.8 thousand are registered and .6 thousand are unregistered households. The average size of the registered household is 4.53 and of the unregistered household 3.68. For the population as a whole, the household size is 4.44.

13.3. In every 100 registered households, 89 are those who have migrated from N.W.F.P., almost in equal proportion from the urban and rural areas. The remaining have come from other areas of West Pakistan, mostly from Punjab—7 from rural areas and 4 from urban areas. In every 100 unregistered households, the number of households who have migrated from N.W.F.P. is only 27 and from Punjab 36. The remaining 37 are not displaced households.

13.4. Out of 453 persons in every 100 registered households, 220 are males and 233 are females. The sex composition of unregistered households is significantly different. In every 100 unregistered households, there are 368 people of which 202 are males and 166 females, revealing an excess of males in marked contrast to the registered households showing the females in excess.

13.5. In the population of Faridabad the percentage of infants and children (0-4 years) is 13.1; of boys and girls (5-14 years) 29.1 ; of young men and women (15-34 years) 33.4; of middle aged persons (35-54 years) 15.8, and of elderly persons (55 years and above) 8.6.

13.6. The registered households have 43.3 percent illiterates and 56.7 percent literates. 47.2 percent may be considered to be barely literates, not having had schooling even upto the middle standard. 7.2 percent have studied beyond the middle standard but are not matriculates. The matriculates, intermediates and graduates all together are only 2.3 percent of the total population. The population comprising the unregistered households has on the whole a much higher standard of education. Illiterates number 33.0 percent, barely literates 44.6 percent, pre-matriculates 9.2 percent, matriculates 11.2 percent and graduates 2.0 percent.

13.7. *Principal household occupation before and after migration* : If a comparison is made between the principal occupation of a household in Faridabad and its principal occupation in Pakistan before migration, it is seen that there has been a thorough shake up. For example, trade which accounted for the principal occupation of 50.2 percent households in Pakistan is now the principal occupation of only 8.0 percent households. Rents from lands and buildings and pensions were the main sources of income of 11.1 percent households before migration. There is hardly anyone now who may be classed a rentier among the households in Faridabad.

13.8. *Earners and earning dependents* : In every 100 registered households comprising 453 persons, 117 are earners of whom 95 are males and 22 females. The earning dependents are 16—6 males and 10 females. The remaining 320 are non-earning dependents. In every 100 unregistered households, comprising 368 persons, 120 are earners—111 males and 9 females. The earning dependents are only 7—3 males and 4 females. The rest of the 241 are non-earning dependents. Thus, each earner in a typical registered household has to earn enough for his own upkeep and for the support of three more. On the other hand each earner in a typical unregistered household has to support only two besides himself.

13.9. Out of a total income 1000, the income due to earners is 981 and due to earning dependents only 19. The total contribution of males is 873 as against 127 of females. The income derived from principal occupations is 845, from subsidiary occupations 34, from cash doles 94 and from remittances 27.

13.10. As against an average monthly income of Rs. 52 of a male earner in a registered household the income of a male earner in unregistered household is Rs. 184. As against the average monthly income of Rs. 42 for a female earner in registered household, the income is Rs. 113 for female earners in unregistered households.

The monthly income of a male earning dependent in registered household is Rs. 13 as against Rs. 18 in unregistered household. For female earning dependents these incomes are Rs. 7 and Rs. 8 per month respectively.

13.11. *Present occupation* : A classification of all the working earners and earning dependents by their principal occupation shows that the highest proportion is that of unskilled labourers (29.6 percent), followed by subordinate technical work (28.0 percent) and subordinate administrative and executive work (10.0 percent). These three account for more than two-thirds of the entire working population. The other groups which account each for more than 5 percent of the total are traders and brokers (7.8 percent); grasscutters, fuel gatherers and gardeners (6.0 percent) and superior technical work such as engineering, medical, teaching etc. (5.0 percent).

13.12. *Labour force* : In the population of 23.8 thousand there are 6.3 thousand persons in the labour force of which 5.6 thousand are males and .7 thousand females. 47.7 percent of all the males and only 6.2 percent of all the females are in labour force. The labour force represents 26.5 percent of the population as a whole.

13.13. Roughly one could say that a little less than three-fifths of those in the labour force have stable employment, one-eighth are purely on relief work, one-fifth have got temporary employment in trade or are engaged in unskilled labour inside or outside Faridabad and finally one-twelfth are completely unemployed as on the day of the survey.

13.14. 73 percent of the entire labour force is comprised of illiterates (18 percent) and barely literates (55 percent); 15 percent are pre-matriculates and 12 percent are marticulates and graduates. 57 percent of the labour force is comprised of persons having no technical skill; 29 percent have some practical skill but no regular training; 12 percent have practical skill backed by training and a certificate of a lower order and 2 percent possess technical degrees and diplomas.

13.15. There is little difference between the gainfully occupied and the unemployed as far as the standard of their education is concerned. In other words, risk of unemployment is proportionately the same at all levels of education. Unemployment does not appear to have been accentuated because of any reason connected with the educational qualification of the unemployed. The main reason for the unemployment is the general scarcity of opportunities for work.

13.16. 43.4 percent of the males and 5.9 percent of the females are gainfully occupied. 4.3 percent of all males and .3 percent of all females are unemployed and seeking employment. Most of those who are seeking employment are doing so not for the first time and only one out of every seven unemployed among the males is one who is in search of job for the first time. For the population as a whole only 2.2 percent are completely unemployed (in the sense of being without a job and seeking employment on the day of the survey) which gives an estimate of the number unemployed as 530.

13.17. *Under-employment* : The problem in Faridabad is however not merely of securing employment to these 530 but of providing jobs to another 510 who are also practically unemployed or are only scantily employed, judged from the intensity of their employment over a period of three months.

13.18. In addition to these 1040 for whom jobs are required urgently, another 1400 though not without employment, have an income below Rs. 40 per month and in their case also it is necessary to think in terms of jobs bringing higher remuneration.

13.19. *The Unemployed* :   Nearly two-thirds (64 percent) of all the currently unemployed are in the age groups 15-19, 20-24 and 25-29, almost equally divided in the three groups.   One-fifth (20 percent) are in the age group 30-49 and one-eighth (12 percent) in the group 50-59.   Even persons above the age of 60 are seen to be seeking employment and their number is 4 percent of all the unemployed.

13.20.   15 percent of the unemployed who had held a job earlier had an income not exceeding Rs. 25 per month from their previous occupation; 38 percent had incomes ranging between Rs. 26 and 50; 35 percent had incomes ranging between Rs. 51 and 75, and 12 percent had incomes exceeding Rs. 75 per month.   The majority, nearly three-fourth, had held subordinate jobs in the technical line or were unskilled labourers.   A few were clerks or teachers but relatively speaking their proportion is small.

13.21. Two-fifth of the unemployed would be glad to get a job either as an unskilled labourer (21 percent) or as an industrial worker (18 percent).   About one-fourth prefer to establish themselves in trade or some other enterprise of their own. One-tenth desire to be artisans and the same number want to be absorbed in clerical posts.   Of the remaining one-fourth half would prefer a job as a peon or a watchman and half have no preference to show.

13.22. *Consumer expenditure* : The average consumer expenditure per household per month is Rs. 104.   15.6 percent of the households have an expenditure of less than Rs. 50 per month, 43.6 percent an expenditure between Rs. 51 and 100; 24.0 percent between Rs. 101 and 150; and 16.8 percent above Rs. 150.

13.23.   In the population as a whole, a little less than two-third (63.7 percent) of the total expenditure was incurred on food items and a little more than one-third total (36.3 percent) on non-food items.   More than one-fourth of the total expenditure or more than two-fifth of the expenditure on food items was spent on cereals.

13.24. Persons in unregistered households live twice as better than the general population, judged by their per capita expenditure.   The total monthly expenditure per capita in February was Rs. 42.5 in their case compared with Rs. 23.5 of the general population.   The average individual in the unregistered household spent one and half times more on food and two and half times more on non-food items than his counterpart in the registered household.

13.25. 152 out of 1000 persons in Faridabad may be considered to be more or less enjoying the average level of living, 294 living better than the average and 554 worse.

13.26. In the lowest level of per capita expenditure Rs. 5·10, food accounts for 80.6 percent of the total expenditure and cereals alone represent 49.7 percent. At the highest level, that is above Rs. 60, food takes up only 39.9 percent of the total expenditure and creals account for only 7.3 percent. Generally as the level of per capita expenditure rises, the relative importance of expenditure on cereals, pulses, oils, salts and spices etc. is reduced while that on milk and milk products, vegetables, meat, fish and eggs, fruits and nuts etc. is increased. Similarly among non-food items, clothing and footwear, medicines, conveyance, services, rent and taxes etc. assume greater importance in the budget as the level of expenditure rises.

13.27. *Incomings and outgoings* : The stable employment households had an average expenditure of Rs. 118, an average income of Rs. 112, and thus a gap between the two of Rs. 6, representing a deficit of only 5 percent in the budget. In temporary employment households, the gap was much wider, to the extent of 45 percent of the total expenditure of Rs. 89. The average expenditure in the dole and remittance households was Rs. 74 as against an average income of Rs. 54., leaving a gap of Rs. 20, representing 27 percent of the total expenditure. The unemployed households had an average income of Rs. 17 as against an average expenditure of Rs. 69, leaving a gap of Rs. 52 or 75 percent of the total expenditure. All the households taken together showed an average expenditure of Rs. 102, an average income of Rs. 83 and a gap of Rs. 19, to be filled by withdrawal from past savings, sale of assets, loans in cash or more generally credit from shopkeepers.

CHAPTER FOUR

DEMOGRAPHIC

14.1. *Registered and unregistered households* : Our survey is based on information collected from "households". The household, following the definition of the National Sample Survey, was a group of people who lived together and took their meals from a common kitchen for at least 16 days during 30 days preceding the date of enquiry.

14.2. The preliminary enquiry placed the total number of households in Faridabad township at the figure 5,374. These households can be divided into two categories (a) those who are registered with Faridabad Development Board on the basis of eligibility for resettlement benefits in Faridabad and (b) those who have come to Faridabad on their own, have not been registered with the Board and are not entitled to resettlement benefits in the township. (A household has been considered registered if the head of the household is registered; it has been taken as unregistered if the head has not been registered). Our chief concern is with the registered households, but we are interested in the unregistered also. As far as possible, therefore, these two broad categories of households have been discussed separately in the sections that follow. The sample survey has revealed that in every hundred households 89 are registered households and 11 are not registered.

15.1. *Migration*: The 89 registered households have practically all migrated from Pakistan (disregarding a sprinkling of sweeper households—barely exceeding 2 per 1000 registered households— who have been registered even though they are not migrants on account of the dearth of sweepers in the township).

15.2. The 11 unregistered households, however, include both migrant households and others (such as those posted on transfer, non-local persons now settled in Faridabad, local persons, temporary visitors on economic business) in the proportion of 5 to 3.

15.3. In every 100 registered households, 89 are those who have migrated from N.W.F.P., amost in equal proportion from the urban and rural areas. The remaining have come from other areas of West Pakistan, mostly from Punjab—7 from rural areas and 4 from urban areas.

15.4. In every 100 unregistered households, the number of households who have migrated from N.W.F.P. is only 27 and from Punjab 36. The remaining 37 are not displaced households. Among the unregistered but migrant households, households of urban origin predominate over those of rural origin in the ratio of 2:1. This is in striking contrast to the almost equal proportion (a little higher in the case of rural) of households of urban and rural origin among the registered households.

15.5.   Taking all the households, the registered and unregistered together, it is seen that in every 100 households 82 have migrated from N.W.F.P., 14 from the Punjab and other places of West Pakistan and only 4 are households who have not come from Pakistan.   The migrated households, whether they came from N.W.F.P. or Punjab and other places had an almost equal proportion of households of urban and rural origin.

15.6.   When we speak of a household having migrated, we refer to the migration of the head of the household.   The head was of course accompanied by most of the present members of the household at the time of migration.   But not by all.   During the long period of over six years since migration, understandably enough, the households have had new additions (mainly on account of children born).   It would be wrong, therefore, to consider all members of migrated households to be themselves migrants. Our survey shows that although 96 out of every 100 households are migrant households, not more than 80 out of every 100 persons in Faridabad did actually migrate from Pakistan.

15.7.   The following table shows from which districts of N.W.F.P. and Punjab the displaced persons of Faridabad have come and in what proportion :

TABLE 3 (1.3)*:   PERCENTAGE DISTRIBUTION OF DISPLACED PERSONS IN FARIDABAD BY DISTRICTS OF PAKISTAN FROM WHERE MIGRATED

state/district of Pakistan from which migrated	percentage of total migrated
Bannu	46
Dera Ismail Khan	14
Hazara	4
Kohat	11
Mardan	6
Peshwar	6
total : N.W.F.P.	87
Dera Ghazi Khan	8
Other districts of Punjab	3
total : Punjab	11
Other States of Pakistan	2
all migrated	100

*Figures within brackets give the number of the relevant Tables at the end of the Report which may be referred to for further details.

15.8.   87 out of 100 persons who have migrated come from N.W.F.P. Punjab follows, but way behind, with 11.   The remaining 2 are from Kurram Agency and other States of West Pakistan.

15.9.   A little more than four-fifths of those who have come from N.W.F.P. originally belonged to the three districts of Bannu, Dera Ismail Khan and Kohat. Bannu alone accounts for more than half the total number, Dera Ismail Khan slightly

9

less than one-sixth and Kohat a little more than one-eighth. The other districts of N.W.F.P. from which migrations have taken place are Hazara, Mardan and Peshawar, which together account for about one-fifth of the migration from N.W.F.P.

15.10. Almost three-fourths of all migrants from Punjab have come from Dera Ghazi Khan. The other districts from which migrants have come, arranged in the order of their contributions, are Lahore, Sargodha, Multan, Rawalpindi, Sheikhpura, Montgomeri and Lyallpur.

16.1. *Period of arrival* :   All the households now in Faridabad did not arrive in Faridabad at the same time. The following table shows for different periods of time what percentage of the present number of households had arrived in Faridabad by then. The information for registered and unregistered households has been given in separate columns to bring out the difference between the two types of households in this matter :

TABLE 4 (1.4) : PERCENTAGE DISTRIBUTION OF THE REGISTERED AND UNREGISTERED HOUSEHOLDS BY THEIR PERIOD OF ARRIVAL IN FARIDABAD

period	cumulative percentages		
	registered households	unregistered households	all households
(1)	(2)	(3)	(4)
February 1949	19	2	17
February 1950	70	23	65
February 1951	94	45	89
February 1952	99	70	96
February 1953	99	80	97
February 1954	100	100	100

16.2. 19 percent of the registered households have been in Faridabad for more than 5 years, 70 percent for more than 4 years, 94 percent for more than three years. Households with a stay of less than two years are only 1 percent of the total.

16.3. The unregistered households cannot lay claim to such long history. In February 1950 when 70 percent of the registered households were already in Faridabad only 23 percent of the unregistered households had arrived. A year later when all but six percent of the registered households were in the town, more than half (55 percent) of the unregistered households were yet to come. During the next year the registered households increased by 5 percent but the acquisition in strength of the unregistered households was to the extent of 25 percent. In the next two years there was hardly any increase (1 percent) in the number of registered households but the unregistered households continued to increase from 70 percent to 100 percent.

16.4. The reason for this difference in pattern can be found in the history of the development of the town. In the initial stages Faridabad was a camp meant only for registered displaced persons. There was nothing much to do for unregistered

households there. When the activities in connection with the construction of the township started, practically all the registered households had arrived. At the same time opportunities arose for a few unregistered persons to take up work which the registered were not able to do. With the growth of the town, expansion of offices, health services, installation of power house, and establishment of a number of industries such opportunities increased and drew a number of unregistered persons to Faridabad.

17.1. *Household size* : In every 100 households there are 444 persons in the township. This is so if we do not make a distinction between the registered and unregistered households. In the case of registered households, in every 100 households there are 453 persons. In every 100 of the unregistered households, on the other hand, there are only 368 persons. The difference is significant and shows that the typical unregistered household has almost one person less than the typical registered household.

17.2. If we consider a household having 1, 2 or 3 members as a small household, one which has 4, 5 or 6 members as a medium household, one which has 7, 8 or 9 members as a large household and one which has 10 or more members as a very large household, we may summarize the results of our classification of 100 registered and 100 unregistered households in the following table :

TABLE 5 (2.1) : PERCENTAGE DISTRIBUTION OF REGISTERED AND UNREGISTERED HOUSEHOLDS BY SIZE OF HOUSEHOLDS

type of household	per 100 households	
	registered	unregistered
(1)	(2)	(3)
small (1—3)	35	55
medium (4—6)	46	38
large (7—9)	16	2
very large (10—)	3	5
all types	100	100

17.3. Among the registered households slightly more than one-third are small households; a little less than half, medium ones; and slightly less than one-fifth are large and very large households. The pattern is different in the case of unregistered households which have a preponderance of small households which exceed half the total. The medium household are a little less than two-fifths and the large and very large households hardly exceed one-fourteenth of the total. Thus while 19 out of 100 registered households have a household size exceeding six, such households are only 7 in 100 unregistered households.

18.1. *Males and females* : Out of 444 people in every 100 households taking together registered and unregistered ones, 218 are males and 226 are females. The females are slightly in excess of the males. For every 1000 females there are 966 males.

18.2.　Out of 453 persons in every 100 registered households 220 are males and 233 are females.　For every 1000 females there are only 944 males.

18.3.　The sex composition of unregistered households is, however, significantly different.　In every 100 unregistered households there are 368 people of which 202 are males and 166 females revealing an excess of males to the extent of 1215 males per 1000 females in marked contrast to the registered households showing the females in excess.

19.1.　*Relationship in households* :　If we consider 100 households there are 444 persons in them and their household relationship is as shown below :

TABLE 6 : DISTRIBUTION OF POPULATION OF 100 HOUSEHOLDS BY THEIR HOUSEHOLD RELATIONSHIP

household relationship	number in 100 households
heads of households—	
male (single)	7
male (married)	71
male (widower)	7
female (single)	—
female (married)	2
female (widow)	13
	100
wives of heads of household	67
sons of heads of household	101
daughters of heads of household	93
	194
male relatives of heads of households (other than sons)	31
female relatives of heads of households (other than daughters)	50
	81
persons unrelated to the head of the household—	
male	1
female	1
	2
grand total—	
males	218
females	226
all persons :	444

19.2. 71 out of 100 households have a married male as the head of the household. 7 in every 100 households have a male widower as the head; the same number of households have as head a single male. Thus, in 85 out of 100 households, the head of the household is a male. Of the 15 female heads of households 13 are widows and 2 are married. A very small number, much less than 1 per hundred households, have a single female as head. 15 households with females as heads in every 100 households is a much larger proportion than the corresponding figure of 8 in North-West India and 10 in all-India as given in the 1951 Census Report. This peculiarity of Faridabad is explained by the fact that a large number of widows are maintaining themselves and their families on Government doles.

19.3. Among the dependents, the sons of the heads of the households are in excess of the daughters by 8 per 100 households and this excess of males is more than compensated by the excess of female relatives of the head of the household over the male relatives which is 19 per 100 households. Persons unrelated to households are one male and one female in every 100 households and they are mainly domestic servants.

20.1. *Population* : The size of the household provides a means by which we can arrive at an estimate of the population of Faridabad. There are, as we know 5374 households and every 100 households have 444 persons. This gives us an estimate of 23.8 thousand for the population of Faridabad in March 1954. It would have been easy to ascertain the accuracy of the figures if Faridabad Administration had any reliable estimates of the population. Unfortunately their estimates range from 23,000 to 26,000. There is, however, the 1951 census information, particulars about which are contained in the National Register of Citizens in Faridabad. The information in the National Register was analysed and the age distribution as obtained from the analysis of this census data (March 1951) and the distribution as obtained from the present sample survey (March 1954) have been presented in the following table :

TABLE 7 : COMPARISON OF THE AGE DISTRIBUTION OF FARIDABAD TOWNSHIP AS OBTAINED IN CENSUS (1951) AND SAMPLE SURVEY (1954)

age groups		percentage	
		decennial census (March 1951)	sample survey (March 1954)
(1)		(2)	(3)
infants	(0)	1.6	2.4
children	(1– 4)	9.0	10.7
boys & girls	(5–14)	29.1	29.1
young persons	(15–34)	34.2	33.4
middle aged	(35–54)	18.2	15.8
elderly persons	(55 and above)	7.9	8.6
all ages		100.0	100.0

20.2. The agreement is close. The census, however, gave a total of 23.0 thousand as against our estimate of 23.8($\pm$.2) thousand. The discrepancy is much

reduced if we take into account the subsequent migrations and the natural increase due to the difference between the larger number of births and lower number of deaths. The records of Faridabad Development Board show that 810 persons, 404 males and 406 females, were shifted to Rewari, soon after the census in March 1951. This was counter-balanced by the arrival of about 900 displaced persons from Sonepat and Yole camps in March 1951 and April 1952 respectively. As a result of these migrations there was thus a net addition of about 100 to the population. To this we have to add the increase in population by natural growth during the three years since the last census. Our survey has recorded 60 births and 23 deaths during one year in the 500 sample households. This gives a net addition to population at the rate of 74 per 1000 house-holds. Our survey reveals, moreover, that there were only 90 percent of the present number of households in February 1951. For purposes of rough calculation, we may assume an average of 95 percent of the present number of households i.e. 5100 households, living in the township during the period subsequent to the census. For these 5100 households of Faridabad, the net addition in 3 years may be put at 1.1 thousand. Taking the Census figure as the base, the present population thus works out to 24.1 thousand as against our estimate of 23.8($\pm$.2). The agreement is altogether satisfactory especially when it is borne in mind that a number of persons may have migrated to some other place in search of resettlement without the knowledge of the authorities or may have gone away temporarily in pursuit of some job. On the other hand a few may have come, but their number is likely to be much smaller as avenues of employment have not been too wide to offer attraction to outsiders.

21.1. *Age structure* : The definition of age in our survey was the same as in the National Sample Survey and in the Indian Census. Age meant number of comple-ted years at the birthday preceding the enquiry. The age of an infant who has not completed 12 months of life is recorded zero. In the following table the number of males and females in each age group has been shown as percent of total number :

TABLE 8 (2.2) : PERCENTAGE DISTRIBUTION OF AGE

	age group	percentage		
		males	females	total
(1)	(2)	(3)	(4)	(5)
infants and children	0— 4	6.8	6.3	13.1
boys and girls	5—14	14.2	14.9	29.1
young men and women	15—24	10.8	10.9	21.7
	25—34	6.4	5.3	11.7
middle aged persons	35—44	4.0	4.1	8.1
	45—54	3.6	4.1	7.7
elderly persons	55—69	2.8	4.0	6.8
	70 & over	0.5	1.3	1.8
all persons		49.1	50.9	100.0

21.2. We have already seen that this age structure of Faridabad population is in fairly close accord with the age distribution obtained from the analysis of the 1951 census data for the township. Infants (age : 0) number 2.4 percent of the total. Infants and children taken together are 13.1 percent of the population. Boys and girls (age : 5-14) account for 29.1 percent. Thus the population under 15 years of age is 42.2 percent of the total. Youngmen and young women (age : 15-34) number 33.4 percent and middle aged persons (age : 35-54) 15.8 percent. The number of elderly persons of age 55-69 is 6.8 percent and persons of age 70 and over are 1.8 percent.

21.3. The main feature of the age structure is the high proportion of juveniles i.e. persons below the age of 15. Comparative figures are shown in the following table :

TABLE 9 : COMPARISON OF THE PROPORTION OF JUVENILES IN THE POPULATION OF FARIDABAD, NORTH WEST INDIA, NORTH INDIA, U.K. AND FRANCE

	percentage to total population of		
	person under age 15	infants and young children	boys and girls
(1)	(2)	(3)	(4)
Faridabad	42.2	13.1	29.1
North West India	39.6	14.5	25.1
North India	38.5	13.5	25.0
India	38.3	13.5	24.8
United Kingdom	22.5	8.6	13.9
France	21.8	7.2	14.6

The juvenile proportion in the population of India is much higher than in countries of Europe but in Faridabad the proportion is even higher than for India or any of the census population zones. The implication of this higher proportion of persons below the age of 15 is a corresponding increase in the burden on the earning members who have to support a larger number of dependents who are unable to work and earn because of their young age.

21.4. It is interesting to compare the structure of population in Faridabad with the structure of population in Delhi, Bombay and Calcutta, and India. Except for a higher proportion of boys (by 4.1 percent) and girls (by 4.4 percent) and lower proportion of middle aged men (by 5.7 percent) and middle aged women (by 3.3 percent), there is little difference in the structure of population of India and that of Faridabad. Disregarding the internal shifts between infants and young children on one hand, and boys and girls on another and lumping the two to form the category of juveniles, below the age of 15 years, there is seen to be fairly close agreement between Delhi and Faridabad. The main exception is the percentage of elderly women who are more than 1½ times (10.0 percent) their proportion (6.0 percent) in Delhi. The structure is, however, markedly different from that of Bombay and Calcutta where

young and middle aged men and women are over represented as compared to Farida-
bad.   Males below the age of 15 years in Bombay and Calcutta are almost half their
proportion in Faridabad.   This naturally must result in a higher proportion of the
population representing the labour force in Bombay and Calcutta compared to

TABLE 10 :   COMPARISON OF THE STRUCTURE OF POPULATION OF FARIDABAD WITH
THAT OF DELHI, BOMBAY AND CALCUTTA, AND INDIA

(1)		percentage			
		Faridabad	Delhi	Bombay, Calcutta	India
		(2)	(3)	(4)	(5)
males under 15 years :					
infants and young children :	1– 4	13.8	19.3	7.7	13.2
boys :	5–14	29.0	21.4	14.5	24.9
sub-total		42.8	40.7	22.2	38.1
young men :	15–34	34.9	33.2	49.1	32.6
middle aged men :	35–54	15.3	18.6	24.1	21.0
edlerly men :	55 and above	7.0	7.5	4.6	8.3
males : all ages		100.0	100.0	100.0	100.0
females under 15 years					
infants and young children :	1– 4	12.4	18.4	13.4	13.9
girls :	5–14	29.3	23.7	22.7	24.7
sub-total		41.7	42.1	36.1	38.6
young women :	15–34	32.0	35.4	40.0	33.3
middle aged women :	35–54	16.3	16.5	18.0	19.6
elderly women :	55 and above	10.0	6.0	5.9	8.5
females : all ages		100.0	100.0	100.0	100.0

Faridabad and we shall discuss this matter further while dealing with the labour
force of Faridabad.

22.1.   *Marital status* :   Males in Faridabad population are 49.1 percent and
females 50.9. Of all the males, 59.1 percent are single, 36.9 percent are married and 4.0
percent are widowers.   Among the females, the single number 47.3 percent, married
37.7 percent and widowed or separated 15.0 percent.   Taking the males and females
together 53.1 percent are single, 37.3 percent married, and 9.6 percent are widowed
or separated.   The separated are 0.1 percent in all and for convenience we shall
include them among the widowers or widows in subsequent discussion.

22.2.   Below the age of 15 there are no men who are married; among women
there are a few who are married but they barely exceed 1 percent of the total of all the

females below the age of 15. 93.5 percent of all the males in the age group (15-19) continue to be single but the proportion of the single among females in this age group is only 46.1 percent; married women number 53.2 percent and 0.7 percent of all the females in the age group are already widows at this early age. In the next age group of 20-24. 60.0 percent of males are married, 1.7 percent are widowers and single persons are reduced to 38.3 percent. 90.2 percent of the women in this age group are married. The single ones and widows are each only 4.9 percent. There are no women unmarried after the age of 25 and as we move up into the higher age groups, the proporion of widows is seen to increase. In the age group 30-39 almost one-sixth of all the females are widows. In the age group of 40-49, their proportion is more than a third. In the next age group, 50-59, the proportion increases to 47.5 percent, steeply rising to 85.7 percent in the age group 60-69. Women over 70 years of age are all widows. As for the males most of them are married by the time they reach the age of 25 and in the age group 25-29 only 9.7 percent of men are single. Between the ages of 30-59 the proportion of single males varies between 2.4 and 4.3 percent in different age groups, representing perhaps the section of chronic bachelors. There are however no men above the age of 60 who are single.

22.3. If we compare these figures with the figures of North West India as has been done in the following table, two facts stand out :

TABLE 11 (2.3) : COMPARISON OF MARITAL STATUS OF THE POPULATION OF FARIDABAD WITH THAT OF NORTH WEST INDIA CENSUS ZONE

	percent of all males				percent of all females			
	single	married	widowed	all males	single	married	widowed	all females
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Faridabad	59.1	36.9	4.0	100.0	47.3	37.7	15.0	100.0
North West India	50.3	43.7	6.0	100.0	41.4	48.8	9.8	100.0

First, the proportion of married persons in the population of Faridabad is significantly smaller compared to the proportion of the married in the North West India census population zone. This is true for both men and women. Married men in Faridabad are fewer by 7 per 100 males and married women by 11 per 100 females. Second, the proportion of widows to married women in Faridabad is double that in North West India. For every 5 married females there is one widow in North West India, but in Faridabad for the same number of married women there are two widows. The contrast appears striking as North West India population zone—more than any other—may be assumed to have population characteristics akin to the inhabitants of Faridabad who have mostly come from N.W.F.P. and Punjab.

23.1. *Education* : Educational standard of every member of the household included in the sample was ascertained and the information has been compiled in the form of tables showing for males and females, in registered and unregistered households separately, the number having different educational standard in each of several age groups. The broad results are shown in the table below:

10

TABLE 12 (2.4) :   PERCENTAGE DISTRIBUTION BY EDUCATION AND SEX IN REGISTERED AND UNREGISTERED HOUSEHOLDS

education standard	percentage of total population in registered households			percentage of total population in unregistered households		
	males	females	total	males	females	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
illiterate	12.8	30.5	43.3	12.6	20.4	33.0
literate, but not middle	27.6	19.6	47.2	25.2	19.4	44.6
middle, but not matric	5.9	1.3	7.2	4.9	4.3	9.2
matric and intermediate	2.2	0.1	2.3	10.7	0.5	11.2
graduate & postgraduate	0.0	—	0.0	1.5	0.5	2.0
total	48.5	51.5	100.0	54.9	45.1	100.0

23.2.   The registered households have 43.3 percent illiterates and 56.7 percent literates. 47.2 percent may be considered to be barely literates, not having had schooling even upto the middle standard.   7.2 percent have studied beyond the middle standard but are not matriculates.   The matriculates, intermediates and graduates all together, are only 2.3 percent of the total population. (There is a very small number of graduates—less than one-twentieth of one percent—which has been shown as 0.0 in the table).

23.3.   In the unregistered households illiterates number 33.0 percent, 13.3 percent less than in the population of registered households.   Literates are 67.0 percent of which 44.6 percent are barely literates and 9.2 percent are middle but not matric. The contrast with registered households is striking in the much larger proportion of matriculates (11.2 percent as compared to 2.3 percent) and graduates and postgraduates (2.0 percent as compared to 0.0 percent).   The population comprising the unregistered households has thus on the whole a much higher standard of education, which as we shall see in subsequent sections, has an important bearing on the nature of their employment and their income.

23.4.   A clearer insight is afforded if males and females are considered separately as the pattern of education is significantly different in the two cases.   The contrast is brought out in the following table:

TABLE 13 (2.4) : COMPARISON OF EDUCATION STANDARD OF MALES AND FEMALES IN REGISTERED AND UNREGISTERED HOUSEHOLDS

education standard	registered households		unregistered households	
	percentage of males to all males	percentage of females to all females	percentage of males to all males	percentage of females to all females
(1)	(2)	(3)	(4)	(5)
illiterate	26.3	59.4	23.0	45.2
literate but not middle	56.9	38.1	46.0	43.0
middle but not matric	12.1	2.3	8.8	9.7
matric and intermediate	4.6	0.2	19.5	1.1
graduate & postgraduate	0.1	—	2.7	1.0
all	100.0	100.0	100.0	100.0

23.5. In registered households a little more than one-fourth the total number of males are illiterate, between half and three-fifths barely literate and slightly less than one-eighth, middle but not matric. 1 in 22 males is marticulate and the proportion of graduates is only 1 in 1000. Lower education standard is preponderant among females. Three-fifths of all females in the registered households are illiterate and almost two-fifths are barely literate. Not to say of graduates of which there are none, only 1 in 40 has even attained the middle standard and the matriculate is a veritable rarity, not being more than 1 in 500 females.

23.6. In the unregistered households, the illiterate males are somewhat less than one-fourth, the barely literate between two fifths and half and the middle but not matric a little more than one-twelfth. The difference that strikes is the much higher proportion of matriculates and graduates both among males and females as compared to the population of registered households. In unregistered households the proportion of marticulates is four times larger than in registered households if we consider the males and more than five times if we consider the females. The graduate males are 2.7 percent in unregistered households as against only 0.1 percent in registered households. While there are no graduates among women in registered households, in the unregistered households women graduates number 1 percent of all the women. Females in unregistered households have on the whole a smaller proportion of illiterates (45.2 percent as against 59.4 percent), a higher proportion of barely literates (43.0 percent as against 38.1 percent) and middle but not matriculates (9.7 percent as against 2.3). We have already seen that female matriculates and graduates are in much larger proportion in unregistered households than in the registered households.

23.7. The following table shows the number of illiterates in every 100 males and 100 females of each age group :

TABLE 14 : NUMBER OF ILLITERATES OUT OF 100 MALES AND 100 FEMALES IN DIFFERENT AGE GROUPS IN REGISTERED AND UNREGISTERED HOUSEHOLDS

| age group | number of illiterates in | | | |
| | registered households | | unregistered households | |
	100 males	100 females	100 males	100 females
(1)	(2)	(3)	(4)	(5)
0 to 4	100	97	100	100
5 to 9	35	46	20	50
10 to 14	4	19	—	13
15 to 24	6	47	10	31
25 to 59	14	72	13	22
60 and above	26	95	50	100
all ages	26	59	23	45

Children (age below 5 years) and women 60 years or more in age, are practically all illiterates, as is to be expected. This holds true for both registered and unregistered households. The proportion of male illiterates in the age group 5-9 is a little more than one-third of all the males in that age group in registered households and one-fifth in unregistered households. The illiterate females in this age group are a little less than half in registered households and half in unregistered households. Illiterates are fewest in the age group 10-14 both among males and females. This is no doubt a result of the opportunities of free education being available for all in the township. In higher age groups the proportion of illiterates is seen to increase, gradually for males and sharply for females, in the registered households. In striking contrast with the high proportion (72 percent) of illiterate females in the age group 25-59 in registered households, is the low proportion (22 percent) of illiterate females in this age group in the unregistered households.

24. *Mother tongue* : Most people seem to imagine that migrants from N.W.F.P. now resettled in Faridabad must generally have Pushto as their mother tongue. Our survey has shown there is no warrant for this assumption; not Pushto but Punjabi is the mother tongue of the overwhelming majority of persons as is shown in the following table :

TABLE 15 : PERCENTAGE DISTRIBUTION BY MOTHER TONGUE

mother tongue	percent of total population
Punjabi	84.7
Pushto	5.9
Hindi	6.2
Urdu	1.8
Other languages	1.4
all languages	100.0

25. With this brief account of some general characteristics of the population of Faridabad, we turn to a detailed consideration of the various aspects of its economic life. But before we take up these matters in subsequent sections, it may be of interest to know what the migrant households used to do in Pakistan and what they are now doing. This is the subject matter of discussion in the section that follows.

CHAPTER FIVE

PRINCIPAL OCCUPATION OF MIGRANT HOUSEHOLDS IN INDIA AND PAKISTAN

26.1. One way of observing the change in the occupational pattern of migrant households is to compare the principal occupations of these households in Pakistan with their principal occupations in India, principal occupation being defined as the occupation of any member of the household which contributes towards the major portion of the household income. Such comparison has been made in the following table:

TABLE 16 (3.1–3.3) : PERCENTAGE DISTRIBUTION OF MIGRANT HOUSEHOLDS BY THEIR PRINCIPAL OCCUPATION IN INDIA AND IN PAKISTAN

principal occupation of households	percentage of all the migrant households having the occupation	
	in Pakistan	in India
(1)	(2)	(3)
retail and wholesale trade	50.2	8.0
contractors, brokers, etc.	3.6	1.5
artisans	8.2	10.9
administrative, executive, clerical	5.4	12.1
medical and health	1.5	1.3
education	1.3	2.9
transport and communication	—	2.7
industrial workers	4.2	13.6
labourers	1.0	22.6
domestic servants	0.8	0.6
sweepers	1.0	1.0
cultivators	3.3	0.2
other occupations	4.2	1.9
rentiers, pensioners	11.1	—
living on doles	—	15.3
unemployed	4.2	5.4
all	100.0	100.0

26.2. As may be seen, there has been a thorough shake up in the principal occupation of households. Trade, which held the pride of place in Pakistan and alone accounted for half the households, now remains as a principal occupation of less than one-twelfth of the households. Rents from land and buildings, and pensions etc. were the major source of income of one in every nine of the migrant households in Pakistan. The source has vanished in India and there is hardly any who may be classed a rentier now among the migrant households in Faridabad. One in every

77

30 households was living primarily on income from cultivation in Pakistan; just about 1 in 500 households have cultivation as the principal occupation now. Contractors and brokers have also suffered a reverse; from 1 in every 28 households in Pakistan. their number has been reduced to 1 in 67 in Faridabad.

26.3. The reduction under the group traders, rentiers, cultivators, contractors and brokers etc. has for its counterpart the increase in the number of labourers from 1.0 percent in Pakistan to 22.6 percent in Faridabad; industrial workers from 4.2 percent to 13.6 percent; administrative, executive and clerical workers from 5.4 percent to 12.1 percent; artisans from 8.2 percent to 10.9 percent; workers engaged in medical, health and education activities from 2.8 percent to 4.2 percent and transport and communication from nil to 2.7 percent. Domestic service (0.8 percent) and sweeper's work (0.1 percent) managed to keep their proportions intact.

26.4. A special feature of Faridabad is the system of doles to the destitute households. No household was depending on doles before migration, but now 15.3 percent of all migrant households derive their income mainly from doles.

26.5. Few households have been able to keep to their original principal occupation. The following table shows what proportion of households have the same principal occupation in India as they had in Pakistan :

TABLE 17 (3.1–3.3) : PERCENTAGE OF MIGRANT HOUSEHOLDS HAVING THE SAME PRIN-CIPAL OCCUPATION IN INDIA AS THEY HAD IN PAKISTAN

principal occupation	households having the same principal occupation in India as they had in Pakistan as percentage of households having that occupation in Pakistan.
retail and wholesale trade	11.7
contractors, brokers etc.	—
artisans	28.2
administrative, executive, clerical	30.8
medical and health	42.8
education	50.0
industrial workers	40.0
labourers	60.0
domestic servants	—
sweepers	100.0
cultivators	—
other occupations	10.0
rentiers, pensioners	—

26.6. A point of interest is to see what happened to the households who not retain their principal occupation. For example, 88.3 percent of those originally depending primarily on trade have had to change their occupation. Similarly others. The following analysis throws some light on this aspect :

TABLE 18 (3.2) : DISTRIBUTION OF EACH 100 MIGRANT HOUSEHOLDS HAVING A PARTI-
CULAR PRINCIPAL OCCUPATION IN PAKISTAN ACCORDING TO THEIR
PRINCIPAL OCCUPATIONS IN FARIDABAD

principal occupation in Pakistan	distribution of 100 households who had the principal occupation in Pakistan by their principal occupation in Faridbabad
retail and wholesale trade (100)	retail and wholesale trade (12), contractors (2), artisans (13), administrative and executive (10), medical (1), education (1), transport and communication (3), industrial workers (13), labourers (27), cultivators (1), other occupation (1), living on doles (13), unemployed (3).
contractors, brokers, etc. (100)	artisans (12), administrative and executive (12), education (6), industrial workers (6), labourers (35), other occupations (6), living on doles (23).
artisans (100)	artisans (28), administrative and executive (13), education (3), transport and communication (3), industrial workers (15), labourers (20), domestic servants (5), living on doles (8), unemployed (5).
administrative, executive, clerical (100)	retail and wholesale trade (8), administrative and executive (31) education (8), industrial workers (15), labourers (11), other occupation (4), living on doles (4), unemployed (19).
medical and health (100)	medical and health (43), industrial workers (14), labourers (14), living on doles (29).
education (100)	administrative and executive (33), medical and health (17), education (50).
industrial workers (100)	artisans (5), administrative and executive (30), transport and communication (5), industrial workers (40), labourers (5), living on doles (15).
labourers (100)	industrial workers (20), labourers (60), living on doles (20).
domestic servants (100)	artisans (25), living on doles (75).
sweepers (100)	sweepers (100).
cultivators (100)	retail and wholesale trade (6), artisans (6), education (6), transport and communication (6), industrial workers (6), labourers (32), other occupations (6), living on doles (13), unemployed (19).
other occupations (100)	wholesale and retail trade (15), administrative and executive (10), education (5), transport and communication (10), industrial workers (20), labourers (15), other occupations (10), living on doles (10), unemployed (5).
rentiers, pensioners (100)	wholesale and retail trade (6), contractors and brokers (4), artisans (7), administrative and executive (13), education (4), other occupations (2), living on doles (23), unemployed (8), industrial workers (9), labourers (24).
unemployed (100)	wholesale and retail trade (5), administrative and executive (15), transport and communication (5), industrial workers (10), labourers (5), domestic servants (5), living on doles (40), unemployed (15).

26.7.   Another way of looking at this shift in occupation pattern is to fix attention on households having one particular occupation in Faridabad and to find out the original occupation of each household in the group.   This will give an idea of the manner in which migrant households have been diverted to new occupations. For every 100 migrant households having one particular occupation in Faridabad, the number of households having different occupations in Pakistan have been set forth below:

TABLE 19 (3.3) : PERCENTAGE DISTRIBUTION OF MIGRANT HOUSEHOLDS BY THEIR ORIGINAL PRINCIPAL OCCUPATION IN PAKISTAN FOR EACH PRINCIPAL OCCUPATION IN FARIDABAD

principal occupation in India	distribution of 100 households who have the principal occupation in India by their principal occupation originally in Pakistan
retail and wholesale trade (100)	retail and wholesale trade (74), administrative, executive, clerical (5), cultivators (3), other occupations (8), rentiers, pensioners (8), unemployed (2).
contractors, brokers etc. (100)	retail and wholesale trade (71), rentiers, pensioners (29).
artisans (100)	retail and wholesale trade (61), contractors, brokers etc. (4), administrative, executive, clerical (21), industrial workers (2), domestic servants (2), cultivators (2), rentiers, pensioners (8).
administrative, executive, clerical (100)	retail and wholesale trade (40), contractors, brokers, (3), artisans (9), administrative, executive, clerical (14), education (3), industrial workers (10), other occupation (4), rentiers, pensioners (12), unemployed (5).
medical, health (100)	retail and wholesale trade (33), medical and health (50), education (17).
education (100)	retail and wholesale trade (22), contractors, brokers (7), artisans (7), administrative, executive, clerical (14), education (22), cultivators (7), other occupations (7), rentiers, pensioners (14).
transport and communication (100)	retail and wholesale trade (54), artisans (8), industrial workers (8), cultivators (8), other occupations (15), unemployed (7).
industrial workers (100)	retail and wholesale trade (49), contractors, brokers etc. (2), artisans (9), administrative, executive, clerical (6), medical and health (1), industrial workers (12), labourers (2), cultivators (2), other occupations (6), rentiers, pensioner (8), unemployed (3).
labourers (100)	retail and wholesale trade (59), contractors, brokers (6), artisans (7), administrative, executive, clerical (3), medical and health (1), industrial worker (1), labourers (3), cultivators (4), other occupations (3), rentiers, pensioners (12), unemployed (1).
domestic servants (100)	artisans (67), unemployed (33).
sweepers (100)	sweepers (100).
cultivators (100)	retail and wholesale trade (100).
other occupations (100)	retail and wholesale trade (34), contractors, brokers (11), administrative, executive, clerical (11), cultivators (11), other occupations (22), rentiers, pensioners (11).
living on doles (100)	retail and wholesale trade (44), contractors, brokers (5), artisans (4), administrative, executive, clerical (1), medical and health (3), industrial workers (4), labourers (2), domestic servants (4), cultivators (3), other occupations (3), rentiers, pensioners (16), unemployed (11).

26.8. It may be made clear, lest there be any misunderstanding, that the occupational shifts we are discussing do not relate to individual earners. Our description is confined to the principal occupation of households which may have more than one earner and more than one occupation. This distinction is important to avoid drawing uncalledfor inferences. For example, we have seen that only 12 out of every 100 migrant households who had originally trade for their principal occupation continue to have the same principal occupation. It does not necessarily mean that 88 out of the 100 who were traders in Pakistan have now taken up other work. The original earner may still be continuing his earlier occupation but his income may be less than that of another member of the household—a grown up son or brother, who may have an altogether different occupation. This latter occupation becomes the principal occupation of the household which as a consequence registers a shift from its original category 'trade'.

CHAPTER SIX

ECONOMIC STATUS

27.1.   A convenient and economically significant way of looking at a population is to classify it as (a) earners, (b) earning dependents and (c) non-earning dependents.   These three categories determine the 'economic status' of a person.

27.2.   The earner is one who procures an income which is at least sufficient for his or her maintenance.   The earning dependents, who are mainly women or grown up children, are those who earn some income which is sufficient to meet a part of the cost of their maintenance but, left to themselves, cannot support themselves.   The non-earning dependents are such members of the population who do not take any part in procuring their own livelihood.   They consist in the main of women and children, students, the old and infirm and all others who are supported by the bread-winners of the households.

27.3.   Not all earners in Faridabad work.   The system of doles brings to destitute women and some others an income every month without entailing the obligation of work.   There are also households which are maintained through remittances from their relations engaged in work outside Faridabad.   Odd as it may sound, among the earners have been included also some who are unemployed.   This is because, by definition, the only earner of a household who is out of job but has no one else to depend upon for the maintenance of himself and his family is treated as an earner.

28.1.   The percentages of earners and earning dependents and non-earning dependents have been shown separately for the population of registered households and of the non-registered households in the following table :

TABLE 20 (4.4) : EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS IN REGISTERED AND UNREGISTERED HOUSEHOLDS

	registered households			unregistered households		
	males	females	total	males	females	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
earners	21.0	4.8	25.8	30.1	2.4	32.5
earning dependents	1.3	2.2	3.5	1.0	1.0	2.0
non-earning dependents	26.2	44.5	70.7	23.8	41.7	65.5
total	48.5	51.5	100.0	54.9	45.1	100.0

28.2.   Earning males, in registered households are 21.0 percent, which is much less than the percentage of earning males in the unregistered households who number 30.1 percent.   Female earners in registered households appear to be double the proportion (4.8 percent) compared to female earners in unregistered households (2.4 percent).   But this, as we shall see later, is because a large proportion of female earners

in registered households are widows who are earners by virtue of their getting regular monthly doles from Government for maintaining themselves and their families. Male and female earners together are 25.8 percent in registered households and 32.5 percent in unregistered households.

28.3. Earning dependents number 3.5 percent in registered households of which 1.3 percent are males and 2.2 percent are females. The proportion of earning dependents in unregistered households is almost half and they are only 2.0 percent, equally divided between the males and females.

28.4. In registered households the non-earning dependents are 70.7 percent; males 26.2 percent and females 44.5 percent. In unregistered households, non-earning dependents number 65.5 percent with 23.8 percent males and 41.7 percent females.

28.5. If we consider 100 registered houeholds we find there are 453 persons in them. Earners are 117 of whom 95 are males and 22 females. The earning dependents are 16; 6 males and 10 females. The remaining 320 are non-earning dependents comprised of 119 males and 201 females.

28.6. These proportions do not hold good in the case of unregistered households. 100 unregistered households have 368 persons of which 120 are earners–111 males and 9 females. The earning dependents are only 7–3 males and 4 females. The rest of the 241 persons are non-earning dependents–86 males and 155 females.

28.7. It may be observed from these figures that there are only 117 earners in 100 registered households who have to support 320 non-earning dependents wholly and 16 earning dependents, in part. That is, each earner in a typical registered household has to earn enough for his own upkeep and for the support of three more. On the other hand each earner in a typical unregistered household has to support only two besides himself.

29.1. *Earning strength of households* : The households of Faridabad may be classified according to the number of earners and earning dependents they have. Table 21 gives the distribution of the households according to such classification:

TABLE 21 (7.2) : DISTRIBUTION OF HOUSEHOLDS BY EARNING STRENGTH

earning strength	percentage of households
households having 1 earner	72.6
households having 1 earner and 1 earning dependent	10.2
households having 2 earners	12.4
households having 1 earner and 2 earning dependents	1.6
households having 2 earners and 1 earning dependent	1.4
households having 3 earners	1.6
households having 2 earners and 2 earning dependents	0.2
total	100.0

29.2.   Between three-fourths and seven-tenth of all households have only one earner; between one-fifths and one-fourth have two persons who earn but in a little less than half the households (45 percent), the second person who earns is only an earning dependent.   Not even one in twenty households has three or more persons earning, including the earning dependents.

30.1.   *Earnings and sources of income* :   All the earners and earning dependents can be classified according to those having (a) no occupation and living merely on doles and remittances, (b) only a subsidiary occupation, (c) only a principal occupation and lastly (d) both principal and subsidiary occupations.   The following table shows the percentage of earners and earning dependents in each of the above categories:

TABLE 22 (6.1) : PERCENTAGE OF EARNERS AND EARNING DEPENDENTS HAVING NO OCCUPATION AND SUBSIDIARY AND PRINCIPAL OCCUPATION

| occupation | percentage of earners and earning dependents | | |
	males	females	total
(1)	(2)	(3)	(4)
no occupation	3.3	7.6	10.9
only subsidiary occupation	1.4	4.8	6.2
only principal occupation	56.6	8.6	65.2
principal and subsidiary occupation	16.3	1.4	17.7
all	77.6	22.4	100.0

30.2.   It may be observed that one in every 25 among male earners and earning dependents and one in every 3 among female earners and earning dependents have no occupation.   One in every 60 males and one in every five females have no occupation except a subsidiary occupation.   These two categories account for only one-seventeenth of the males but more than half of the females.   The males in the group are mostly unemployed and the females are recepients of doles.

30.3.   The earners and earning dependents having a principal occupation (with or without a subsidiary occupation) are more than four-fifth of the total (82.9 percent) and those having a subsidiary occupation (with or without a principal occupation) are a little less than one-fourth (23.7 percent.)

31.1.   If we assume, for the sake of convenience, that the total income of all the earners and earning dependents in the township derived from the four sources —principal occupation, subsidiary occupation, monthly doles from Government and remittances, is 1000, the following table shows how this amount is distributed as

between the incomes contributed by male and female earners and earning dependents and as between the income derived from each of the four sources :

TABLE 23 (6.2) : DISTRIBUTION OF TOTAL INCOME OF EARNERS AND EARNING DEPEN-DENTS AS DERIVED FROM THE FOUR SOURCES OF INCOME—PRINCIPAL AND SUBSIDIARY OCCUPATIONS, DOLES AND REMITTANCES

		distribution of a total income of 1000				
		principal occupation	subsidiary occupation	cash dole	remitt-ances	all sources
(1)		(2)	(3)	(4)	(5)	(6)
earners	male	795	27	23	18	863
	female	34	5	71	8	118
	total	829	32	94	26	981
earning dependents	male	8	1	—	1	10
	female	8	1	—	—	9
	total	16	2	—	1	19
all earners and earning dependents	male	803	28	23	19	873
	female	42	6	71	8	127
	total	845	34	94	27	1000

31.2. It is interesting to find that 981 out of the total income of 1000 is income due to earners and only 19 is earned by earning dependents. The total contribution of males is 873 as against 127 of females. Viewed from another angle, the income of 1000 is made up of an income from principal occupation amounting to 845; from subsidiary occupation 34; from cash dole 94 and from remittances 27. These figures illustrate the minor role played by earning dependents, who contribute less than one-fiftieth of the total income, and the minor importance of subsidiary occupations in the economy which contribute to only one-thirtieth of the total income.

31.3. The income of earning dependents is generally much lower than those of earners and as between men and women the income of men is more than that of women. This is as is to be expected.

31.4. For all households, without making a distinction between the registered and unregistered, we have an average income of Rs 69 per month for male earners, Rs. 46 for female earners and for both male and female earners Rs. 65.

31.5. The earning dependents trail far behind with a monthly income of Rs. 13 for males; Rs. 8 for females and Rs. 10 for both taken together. Earners and earning dependents considered together give an average monthly income for males Rs. 66; for females Rs. 34 and for all Rs. 59.

31.6. The overall averages cloak the large difference in the average monthly income of earners in registered and unregistered households. As against an average

TABLE 24 (6.3) : AVERAGE MONTHLY INCOME OF EARNERS AND EARNING DEPENDENTS IN REGISTERED AND UNREGISTERED HOUSEHOLDS

		average monthly income	
		registered household	unregistered household
earners	males	52	184
	females	42	113
	total	50	178
earning dependents	males	13	18
	females	8	7
	total	10	12

monthly income of Rs. 52 of a male earner in a registered household, the income of a male earner in unregistered household is Rs. 184. As against the average monthly income of Rs. 42 for a female earner in registered household, the income is Rs. 113 for female earners in unregistered households. The differences in the case of earning dependents are less. As against a monthly income of Rs. 13 of a male earning dependent in registered household, a male earning dependent in unregistered household has an income of Rs. 18. Female earning dependent in unregistered household has income of Rs. 7 per month which is less than the average monthly income of a female earning dependent in a registered household by Re. 1 per month. One important source of income in the case of earners in registered households is doles. This source does not exist for the unregistered households.

31.7. If we compare the composition of every 1000 income of the earners and earning dependents in registered households with that of unregistered households we get the following picture :

TABLE 25 (6.3) : DISTRIBUTION OF AN INCOME OF 1000 BY FOUR SOURCES IN REGISTERED AND UNREGISTERED HOUSEHOLDS

	principal occupation	subsidiary occupation	cash doles	remitt- ances	total
(1)	(2)	(3)	(4)	(5)	(6)
registered households	829	35	105	31	1000
unregistered households	971	25	—	4	1000

31.8. In the registered households cash doles and remittances contribute to little less than one seventh of the total income while the contribution from these two sources to the income of earners and earning dependents of unregistered households is very nominal, not even $\frac{1}{2}$ percent. The subsidiary occupations are in either case of minor significance but their importance is still less in unregistered households than in registered households. Practically speaking almost the entire income in unregistered households is derived from principal occupations while nearly four-fifths of the income is derived from this source in the registered households.

CHAPTER SEVEN

LABOUR FORCE

32.1. We include in the labour force only those who are working or seeking employment and exclude those who may have a source of income which is not earned. Thus only the working earners and earning dependents together with all the unemployed, irrespective of whether classed as earners or as non-earning dependents, constitute the labour force.

32.2. The population of Faridabad has been estimated as 238.4 hundred. Only 63.1 hundred are in the labour force. Of this number 55.8 hundred are males and 7.3 hundred females. 47.7 percent of all the males and only 6.2 percent of all the females are in the labour force. For the population as a whole the labour force represents 26.5 percent.

32.3. 43.4 percent of the males and 5.9 percent of the females are gainfully occupied. 4.3 percent of all males and 0.3 percent of all females are unemployed and are seeking employment. Most of those who are seeking employment are doing so not for the first time and only one out of every 7 unemployed among the males is one who is in search of job for the first time. For the population as a whole only 2.2 percent are completely unemployed in the sense of being without a job and seeking employment on the day of the survey which gives an estimate of the number of totally unemployed as 530.

33.1. *Age structure* : In the following table is shown the distribution of the estimated population of Faridabad by industrial status and by age groups. The 'industrial status' means whether a person is gainfully occupied (as employer; employee or own account worker), is unemployed or is not in the labour force. All the gainfully occupied have been shown together in one category but the three sub-categories of those not in the labour force, namely, persons living on doles, persons maintaining themselves on remittances and all other dependents have been shown separately.

TABLE 26 (5.1) : DISTRIBUTION OF THE ESTIMATED POPULATION OF FARIDABAD BY INDUSTRIAL STATUS

(figures in hundreds)

industrial status	number of persons in age group					
	0–14	15–17	18–59	60–69	70–	all ages
(1)	(2)	(3)	(4)	(5)	(6)	(7)
persons in the labour force	0.7	1.9	56.6	3.4	0.5	63.1
gainfully occupied	0.7	1.5	51.9	3.2	0.5	57.8
unemployed seeking employment	—	0.4	4.7	0.2	—	5.3
persons not in labour force	100.0	14.4	49.2	7.9	3.8	175.3
(a) living on doles	0.2	0.2	6.6	1.6	1.0	9.6
(b) receiving remittances	—	—	1.1	0.4	0.2	1.7
(c) dependents	99.8	14.2	41.5	5.9	2.6	164.0
all industrial status	100.7	16.3	105.8	11.4	4.3	238.4

33.2.   90 percent of all the gainfully occupied are in age group 18 to 59.   Only 3 percent are persons below 18 years of age, 7 percent above the age of 60.   Similarly 90 percent of the unemployed also belong to the age group 18 to 59.

33.3.   Practically all below the age of 15, whose number is a little more than 10,000 are not in the labour force.   The few who are gainfully occupied may be estimated about 70.

33.4.   In the next age group of 15-17 there are 150 gainfully occupied and 40 unemployed.   The remaining 1440 in this age group are not in the labour force, being mostly dependents, but there is a sprinkling (about 20) of those living on doles.

33.5.   In the working age group 18 to 59, there are in all 10,580 persons in Faridabad of which 5,190 are gainfully occupied and 470 are unemployed.   Persons not in the labour force can be estimated at 4,920 with 4,150 dependents, 660 living on doles, 110 receiving remittances.

33.6.   In the age group 60 to 69 out of a total of 1,140; 320 are seen to be working and 20 seeking employment. Persons not in the labour force are 790 of whom 160 are living on doles, 40 receiving remittance and 590 are living with others as dependents.

33.7.   Even the very old, past 70 in age have 50 people working out of 430; 380 are not in the labour force of which 100 are being maintained on doles, 20 are receiving remittance and 260 are dependents.

34.1.   The following table shows from what age groups and in what proportion the labour force of males and females is derived :

TABLE 27 (5.2) :   PERCENTAGE OF MALES AND FEMALES IN THE LABOUR FORCE BY EACH AGE GROUP

age group	percent of all males in age group			percent of all females in age group		
	working	seeking employment	total labour force	working	seeking employment	total labour force
(1)	(2)	(3)	(4)	(5)	(6)	(7)
8—14	0.6	—	0.6	0.8	—	0.8
15—19	40.3	8.9	49.2	3.6	—	3.6
20—24	90.4	8.7	99.1	7.8	1.0	8.8
25—39	91.5	7.4	98.9	13.3	0.6	13.9
40—59	81.6	7.0	88.6	13.6	0.6	14.2
60—69	60.5	4.6	65.1	6.4	—	6.4
70—89	30.8	—	30.8	3.7	—	3.7

34.2.   For each age group the percentage of males who are working, who are seeking employment and who are in the labour force has been shown as percentage of all the males in the age group.   Similar information has been given for females.   A little

less than half of all the males in the age group 15-19 are in the labour force and in the next age group 20 to 24 almost all the males are either working or are in search of employment. The same is the situation in the next age group 25 to 39 and practically the same in the next age group 40 to 59, except that in this age group 5.7 percent are living on doles and remittances and 5.7 percent have ceased to work and are not in the labour force. There is a sharp decline in the proportion of working people in the age group 60 to 69 which is reduced to 60.5 percent. In the next age group 70 to 89, almost a third of the total number in the age group are still working, which is rendered possible because of the relief work especially arranged for the old in the township. Slightly more than two-thirds, however, are not in the labour force, somewhat less than half of which are being maintained by cash doles and remittances.

34.3. The level of unemployment in each age group shows a tendency to fall off as the age increases. It is highest in the age group 15 to 19 (8.9 percent), is about the same in the next age group 20 to 24 (8.7 percent), but is lower (7.4 percent and 7.0 percent) in the age groups 25 to 39 and 40 to 59 respectively, falling down to 4.6 percent in the age group 60 to 69.

34.4. In the case of females the highest percentage of working persons is 13.6 in the age group 40 to 59 and about the same in the age group 25 to 39. The number of working females in the age group 20 to 24 is 7.8 percent; in the age group 15 to 19 it is 3.6 percent. The unemployed women number 1.0 percent in the age group 20 to 24, and 0.6 percent in each of the two groups 25 to 39 and 40 to 59.

35.1. *General education and technical qualifications* : The labour force is comprised of persons with different standard of general education and technical training or experience. The illiterates and the post-graduates stand at the two extremeties of the scale of general education and the completely unskilled and those with technical degrees or diplomas mark the extreme points of the scale of technical qualifications. For the sake of convenience let us consider four categories of general education and four categories of technical qualifications as shown below :

general education	*technical qualification*
1. illiterates	1. no technical skill
2. primary but not middle (or barely literates)	2. merely practical skill
3. middle but not matric (or prematric)	3. practical skill, backed by technical training and a lower order certificate.
4. matriculates and above	4. skill and technical degree or diploma of a higher order.

35.2. If we classify all persons comprising the labour force first according to their standard of general education and then classify still further all persons belonging to the same general education group according to their technical qualifications and

do this separately for persons who are (a) gainfully occupied, (b) unemployed and (c) in labour force, we can present the result of our analysis in the following table :

TABLE 28 (7.8) : ESTIMATED NUMBER OF PERSONS IN LABOUR FORCE IN FARIDABAD AND THEIR PERCENTAGES, CLASSIFIED BY THEIR EDUCATIONAL AND TECHNICAL QUALIFICATIONS

general education and technical qualifications	estimated number of persons in township (in hundreds)			percentage		
	gainfully occupied	un-employed	all labour force	gainfully occupied	un-employed	all labour force
(1)	(2)	(3)	(4)	(5)	(6)	(7)
illiterate	10.8	0.9	11.7	19	16	18
no technical skill	8.1	0.7	8.8	14	12	14
merely practical skill	2.4	0.2	2.6	4	4	4
practical skill, training and lower order certificate.	0.3	—	0.3	1	—	—
barely literate	31.6	3.0	34.6	55	56	55
no technical skill	19.1	1.9	21.0	33	36	33
merely practical skill	9.9	0.8	10.7	17	14	17
practical skill, training and lower order certificate.	2.6	0.3	2.9	5	6	5
pre-matric	8.8	0.8	9.6	15	16	15
no technical skill	3.4	0.4	3.8	6	8	6
merely practical skill	3.1	0.1	3.2	5	2	5
practical skill, training and lower order certificate.	2.3	0.3	2.6	4	6	4
matriculates and above	6.6	0.6	7.2	11	12	12
no technical skill	1.9	0.4	2.3	3	8	4
merely practical skill	1.7	0.1	1.8	3	2	3
practical skill, training and lower order certificate.	1.7	0.1	1.8	3	2	3
practical skill, training and technical degree or diploma.	1.3	—	1.3	2	—	2
all classes	57.8	5.3	63.1	100	100	100
no technical skill	32.5	3.4	35.9	56	64	57
merely practical skill	17.1	1.2	18.3	29	22	29
practical skill, training and lower order certificate.	6.9	0.7	7.6	13	14	12
practical skill, training and technical degree or diploma.	1.3	—	1.3	2	—	2

35.3.   There is little difference between the gainfully occupied and the unemployed as far as the standard of their education is concerned. In each category the two percentages are in close agreement.

35.4.   A little less than three-fourths (73 percent) of the entire labour force i comprised of illiterates (18 percent) and barely literates (55 percent). Less than

one-sixth and more than one-seventh (15 percent) belong to the group we have termed 'pre-matric'. Somewhat less than one-eighth (12 percent) are matriculates or graduates. In absolute numbers the survey has estimated the number in this last category as 720.

35.5. Almost three-fifths (57 percent) of the labour force is comprised of persons having no technical skill and between one-third and one-fourth (29 percent) having merely practical skill with no regular training in any institution. Only one in eight (12 percent) has practical skill backed by regular training and certificate of a lower order. The remaining 2 percent are those who have not only practical skill but possess technical degrees or diplomas of a higher order. The engineers, doctors, trained teachers and so on belong to this group. In absolute numbers, the technically trained persons in the township may be estimated at about 890; 130 having technical degrees or diplomas and the rest not so well qualified but never-the-less technically trained and possessing certificates of a lower order.

36.1. We have so far considered the labour force as a whole not making a distinction between the persons in the labour force belonging to the registered households and the unregistered households. This distinction is, however, important. In the registered households, the labour force represents 25.8 percent of the population of which 23.4 percent are working earners and earning dependents and 2.4 percent are the unemployed, seeking employment. In the unregistered households the labour force represents 34.5 percent of the population of which 1 percent are unemployed and seeking employment and the remaining 33.5 percent are working earners and earning dependents.

36.2. It is interesting to compare the educational standard of gainfully employed persons in the registered households with those of the unregistered households. The following table which gives the percentage distribution of the gainfully occupied persons in the two types of households by sex and education brings out the comparison clearly :

TABLE 29 (5.9) : PERCENTAGE DISTRIBUTION OF THE GAINFULLY OCCUPIED PERSONS IN REGISTERED AND UNREGISTERED HOUSEHOLDS BY EDUCATION AND SEX

	registered households			unregistered households		
	males	females	total	males	females	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
illiterate	12.2	72.1	20.0	7.8	40.0	10.1
literate but not middle	62.4	18.0	56.6	40.6	40.0	40.6
middle but not matric	17.1	6.6	15.7	12.5	—	11.6
matric and intermediate	8.3	3.3	7.7	34.4	—	31.9
graduates and postgraduates	—	—	—	4.7	20.0	5.8
total	100.0	100.0	100.0	100.0	100.0	100.0

36.3. In the registered households, taking males and females together, only 7.7 percent of all the gainfully occupied persons are matriculates or intermediates and none of them graduates. In the unregistered households, 31.9 percent of all the gainfully occupied persons are matriculates and intermediates and another 5.8 percent are graduates and post-graduates.

36.4. The illiterates are one-fifth of all the gainfully occupied persons in the registered households but only one-tenth in the unregistered households.

36.5. Among women who are gainfully occupied only one in 30 is a matriculate in registered households but one in every 5 gainfully occupied women in unregistered households is a graduate.

37.1. Another interesting comparison is between the unemployed and the gainfully occupied as regards their educational qualification. It will be seen from the following table that there is very little difference between these two components of labour force as far as their general educational standard is concerned.

TABLE 30 (5.9) : COMPARISON OF GAINFULLY OCCUPIED AND UNEMPLOYED PERSONS ACCORDING TO THEIR LEVEL OF EDUCATION

	percent of total having education standard					
	illiterate	barely literate	pre-matric	matric	graduate	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
registered households—						
gainfully occupied	20.0	56.6	15.7	7.7	—	100.0
unemployed	16.7	56.2	16.7	8.3	2.1	100.0
unregistered households—						
gainfully occupied	10.1	40.6	11.6	31.9	5.8	100.0
unemployed	—	50.0	—	50.0	—	100.0

37.2. Unemployment does not appear to have been accentuated because of any specific reason connected with the educational qualification of the unemployed. In other words, risk of unemployment is proportionately the same at all levels of education and training. For example, one may not ascribe the difficulty in getting employment to a lower level of education of the unemployed or to a much higher level of their education. Neither is the case and the main reason for unemployment is the general scarcity of opportunities for work.

PRINCIPAL AND SUBSIDIARY OCCUPATION

38.1. We have already discussed in considerable detail the present principal occupation of migrant households and have seen how striking have been the shifts viewed in relation to the pattern of their principal occupations previous to their migration to India from Pakistan.

38.2. *Principal household enterprise* : We now turn to the consideration of the principal enterprise of all the households and not merely the migrant households. For this purpose we will follow the classification adopted by the National Sample Survey to describe the enterprise of the principal earner of the household. The enterprises are divided into five classes :

1. animal husbandry and fuel collection.

2. manufacture and processing of goods on a small scale (including artisans working on their own, and confectioners, halwais etc)

3. transport

4. trade

5. services, and professions, including building contractors.

38.3. If we take 1000 households and sort these out according to the enterprise of the principal earner of the household we will find the following picture :

TABLE 31 : DISTRIBUTION OF HOUSEHOLDS BY THE ENTEPRISE OF THE PRINCIPAL EARNER

enterprise of the principal earner of the household	number of households per 1000 households
animal husbandry and fuel collection	16
manufacture and processing of goods on a small scale	72
artisans, own account	52
confectioners (halwai etc.)	20
transport	4
trade	60
services, professions, including building contractors	636
all enterprises	788
no enterprises	212
cash dole and remittance holders	176
only earner unemployed	36
all total	1000

38.4.   More than one in every 6 households derive the major part of their income from Government doles or remittances.   One out of every 30 households has the only earner in the household unemployed.   These two types of households constitute a little more than one-fifth of all the households.   In the remaining four-fifth of the households the principal earner is engaged in some enterprise.   The majority (63.6 percent) belong to the enterprise group 'services and professions'.   Manufacture and processing of goods on a small scale comes next, but far behind (with 7.2 percent), followed on its heels by trade (6.0 percent) and, after a long way, by animal husbandry and fuel collection (1.6 percent).   Transport has only 0.4 percent households to account for.

39.1.   *Occupation of earners and earning dependents* :   So far we have been discussing only the principal enterprise of a household.   In the following section we shall discuss the principal occupation of all the working earners and earning dependents.   The National Sample Survey occupational classification has been adopted for this purpose.

39.2.   According to our estimate, there are in Faridabad Township 57.8 hundred working earners and earning dependents.   The following table shows how this number is distributed between the different occupational groups :

TABLE 32 (6.7) :   DISTRIBUTION OF WORKING EARNERS AND EARNING   DEPENDENTS OF FARIDABAD BY THEIR PRESENT OCCUPATION

present occupation	number in hundreds			percent of total
	earners	earning dependents	total	
(1)	(2)	(3)	(4)	(5)
superior administrative or executive work	0.4	—	0.4	0.7
superior technical work—				
engineering	0.2	—	0.2	0.4
medical and health	0.5	—	0.5	0.9
teaching	1.6	—	1.6	2.8
all others	0.5	—	0.5	0.9
subordinate admn. & executive work	5.7	0.1	5.8	10.0
ministerial work	2.8	—	2.8	4.8
subordinate technical work	13.9	2.4	16.3	28.0
grasscutters, fuel gatherers, gardeners	1.7	1.7	3.4	6.0
rearers of animals (cow and goat keeping, poultry etc.)	0.1	1.3	1.4	2.4
manufacturers of cooked food & beverages	1.7	0.3	2.0	3.6
traders, brokers	4.2	0.3	4.5	7.8
unskilled labourers	15.6	1.6	17.2	29.6
others—unspecified	1.2	—	1.2	2.1
all occupations	50.1	7.7	57.8	100.0
estimated number of households		53.7		
estimated population		238.4		

39.3. The highest proportion is that of unskilled labourers (29.6 percent) followed by subordinate technical work (28.0 percent), and subordinate administrative and executive work (10.0 pecent). These three account for more than two-thirds of the entire working population. The other groups which have each more than 2 percent of the total are traders and brokers (7.8 percent); grasscutters, fuel gatherers, gardeners (6.0 percent), superior technical work (5.0 percent), ministerial work (4.8 percent), manufacturers of cooked food and beverages (3.6 percent) and rearers of animals (2.4 percent). All the rest are only 2.8 percent.

39.4. For earning dependents the pattern of occupation is quite different from that of earners. The largest proportion of them (30.5 percent) is engaged in subordinate technical work, followed by grass cutters and fuel gatherers (22.2 percent), unskilled labourers (20.8 percent) and rearers of animals (16.7 percent). The other 3 occupations in order of their importance are manufacturers of cooked food (4.2 percent), traders etc. (4.2 percent) and subordinate administrative and executive work (1.4 percent). For the same occupational classes the distribution of occupation as between males and females is shown in the table below:

TABLE 33 (6.9) : PERCENTAGE DISTRIBUTION OF MALE AND FEMALE WORKING EARNERS AND EARNING DEPENDENTS, BY OCCUPATION

present occupation	males	females
(1)	(2)	(3)
superior administrative and executive work	0.8	—
superior technical work—		
engineering	0.4	—
medical and health	0.6	3.0
teaching	1.9	9.1
all others	1.1	—
subordinate administrative and executive work	11.0	3.0
ministerial work	5.5	—
subordinate technical work	28.6	24.3
grasscutters, fuel gatherers, gardeners	4.0	19.7
rearers of animals (cow keeping, poultry etc.)	0.2	18.2
manufacturers of cooked food (halwai etc.)	4.0	—
traders, brokers	8.7	1.5
unskilled labourers	30.9	21.2
others—unspecified	2.3	—
all occupations	100.0	100.0

39.5. This brings out the interesting point that the 5 occupational groups in order of importance for males are unskilled labourers (30.9 percent), subordinate technical work (28.6 percent), subordinate, administrative and executive work (11.0 percent) traders and brokers (8.7 percent) and ministerial work (5.5 percent). For women, however, the five occupations in order of importance are: subordinate technical work (24.3 percent), unskilled labourers (21.2 percent), grass cutters and fuel gatherers (19.7 percent), rearers of animals (18.2 percent) and teaching (9.1 percent).

40.1.   *Income from occupations* :   These earners and earning dependents following their respective occupations have incomes which differ greatly.   In the following table we show for every one thousand working earners, 1 thousand working earning dependents and 1 thousand of both earners and earning dependents the number getting different incomes from their principal occupations during the month of February 1954.   The incomes have been shown in 8 income groups.

TABLE 34 (6.12) :   DISTRIBUTION OF WORKING EARNERS AND EARNING DEPENDENTS BY INCOME FROM PRINCIPAL OCCUPATION

| | number per thousand | | |
income per month	working earners	earning dependents	working earners and earning dependents
(1)	(2)	(3)	(4)
upto Rs. 25	133	972	245
Rs. 26— 50	285	28	250
Rs. 51— 75	300	—	260
Rs. 76—100	145	—	126
Rs. 101—125	64	—	56
Rs. 126—150	17	—	15
Rs. 151—200	26	—	22
Rs. 201 & above	30	—	26
total	1000	1000	1000

40.2.   None of the working earning dependents has a monthly income exceeding Rs. 50 and an overwhelming majority of them (97.2 percent) have an income less than Rs. 25 per month; only a small proportion (2.8 percent) have an income between Rs. 26 and 50.

40.3.   Among working earners a little more than 1 in every 8 (13.3 percent) has got income less than Rs. 25 per month.   The income group Rs. 26-50 has the second largest proportion of earners (28.5 percent), the largest proportion belonging to the income group Rs. 51-75 (30.0 percent).   The first two income groups (which represent incomes upto Rs. 50 per month) account for a little more than two-fifth (41.8 percent) of all earners, but these groups, as we have seen, exhaust all the earning dependents.   71.8 percent of earners have incomes not exceeding Rs. 75 per month, and 86.3 percent incomes not exceeding Rs. 100.   Only 1 in every 7 (14.5 percent) earners has an income lying between Rs. 76 and 100 per month and 1 in 16 between Rs. 100 and 125 per month.   The number of those having an income in excess of Rs. 125 per month is less than 1 in 14 (7.3 percent).

40.4.   For both working earners and earning dependents, it is interesting to find the number distributed almost equally in the 4 income groups—upto Rs. 25, Rs. 26-50, Rs 51-75 and Rs. 76 and above.   The last group is again equally divided between those having income between Rs. 76 and 100 and those having incomes

exceeding Rs 100 per month, each claiming one-eighth of the total number of working earners and earning dependents.

41.1. *Income comparison* : It is interesting in this connection to compare the gainfully occupied persons of Faridabad township with the gainfully occupied persons of Calcutta on the one hand and the neighbouring small semi-rural town of Old Faridabad (population : 7000) on the other, in respect of their income from occupation. Information regarding Calcutta has been taken from a preliminary (unpublished) report of an unemployment survey of Calcutta conducted in 1953 by the National Sample Survey and relates to a total population of 24.7 lakhs. Data for Old Faridabad is based on a survey undertaken in connection with the present investigation and some other results of this survey are discussed in Chapter 15.

TABLE 35 :   COMPARISON OF INCOME FROM ALL OCCUPATIONS OF THE GAINFULLY OCCUPIED IN CALCUTTA, FARIDABAD TOWNSHIP AND OLD FARIDABAD

| | percentage of gainfully occupied having income per month. | | | | |
	upto Rs. 50	Rs. 51-100	Rs. 101-200	above Rs. 200	total
Calcutta	34	39	16	11	100
Faridabad township	48	40	9	3	100
Old Faridabad	64	27	6	3	100

41.2. It may be observed that a little more than one-third of the gainfully occupied in Calcutta have an income less than Rs. 50 per month. In Faridabad township practically half fall within this group and in Old Faridabad almost two-third. The next income group Rs. 51-100 per month accounts for nearly two-fifths of the total number in both Calcutta and Faridabad township but only a little more than one-fourth in Old Faridabad. Incomes lying between Rs. 101 and 200 per month are earned by a little less than one-sixth of the gainfully occupied in Calcutta, by one-eleventh in Faridabad township and less than one-sixteenth in Old Faridabad. About one in nine have an income exceeding Rs. 200 in Calcutta but in Faridabad township and in Old Faridabad not even 3 in 100 reach this level of income. Thus, while more than one-fourth have an income exceeding Rs. 100 in Calcutta, only one-tenth have such income in Faridabad township or Old Faridabad. Old Faridabad is even worse off than the new township in as much as it has one-third more persons with incomes below Rs. 50 and the same proportion less with incomes between Rs. 51 and Rs. 100.

41.3. This comparison brings out clearly the intermediate position the economy of Faridabad occupies in relation to the economy of a metropolitan city like Calcutta and a small town of the type of Old Faridabad.

42.1. *Subsidiary Occupation* : We have seen that subsidiary occupations do not play an important role if income therefrom is the criterion. Nevertheless, as a large number of persons are engaged in these occupations— 24 percent of all the earners and earning dependents— it is interesting to know what these subsidiary occupations

13

are and what is the kind of income derived from them. The following table shows for males and females separately the proportion in different types of subsidiary occupations :

TABLE 36 (6.4) : DISTRIBUTION OF MALE AND FEMALE WORKING EARNERS AND EARN-
ING DEPENDENTS HAVING ANY SUBSIDIARY OCCUPATION BY THEIR
SUBSIDIARY OCCUPATION

subsidiary occupation	percentage of earners and earning dependents having any subsidiary occupation		
	males	females	all
(1)	(2)	(3)	(4)
wood and dung collection for fuel	27.4	63.5	36.7
vegetable growing	6.8	4.9	6.3
cow keeping	26.5	2.5	20.2
goat keeping	17.9	9.8	15.8
poultry keeping	1.7	2.4	1.9
tailoring	1.7	7.3	3.2
reeling, spinning, basket making, radio repairing and mechanic	3.2	7.2	4.4
grocery, medicine dealer, pakora shop, milk selling, vegetable hawking	6.1	—	4.4
vaid, astrologer, petty contractor, rent receiver	4.4	—	3.2
dai (midwife)	—	2.4	0.7
manual labour	4.3	—	3.2
all occupations	100.0	100.0	100.0

42.2. Notwithstanding the rather wide scatter of occupations, the concentration is heavy in occupations such as wood and dung collection for fuel, cow keeping and goat keeping. Wood and dung collection for fuel is by far the most important of the subsidiary occupations, claiming one-fourth to one-third of all males having any subsidiary occupation and somewhere between two-thirds and three-fifths of all females having a subsidiary occupation. These three together with vegetable growing and poultry keeping accounts for more than four-fifths of all male earners and earning dependents and almost five-sixths of female earners and earning dependents.

42.3. In addition there are occupations of tailoring, reeling, spinning, basket making and dai (midwifery) which complete the list of subsidiary occupations for females.

42.4. The additional occupations for males are trade, which accounts for 6.1 percent, manual labour for 4.3 percent and others (such as radio repairer and mechanic, vaid, astrologer, petty contractor and rent receiver) who are 7.6 percent.

42.5.   The average monthly incomes during the 3 months, December 1953 to February 1954, for selected subsidiary occupations for both males and females taken together are as follows :

TABLE 37 (6.4) : AVERAGE MONTHLY INCOME FOR SELECTED SUBSIDIARY OCCUPATIONS

subsidiary occupation	income (Rs.) per month
wood and dung collection for fuel	5
vegetable growing	2
cow keeping	17
goat keeping	3
tailoring	12
distributive trades	13
manual labour	10

The occupations listed above account for 90 percent of all the earners and earning dependents having any subsidiary occupation.

CHAPTER NINE

OCCUPATION AND INCOME OF WOMEN

43.1. We have already seen that 8.9 percent of all the women are earners, 4.2 percent are earning dependents and 86.9 percent are non-earning dependents. But all earners and earning dependents are not gainfully occupied and out of 13.1 percent who are earners and earning dependents more than half (7.2 percent) are being maintained on unearned income, of which 6.4 percent are getting cash doles and 0.8 percent are receiving remittances.

43.2. Only 6.2 percent of all the women are in the labour force and of this number 5.9 percent are gainfully occupied and 0.3 percent are unemployed. In absolute terms the number of women gainfully occupied may be estimated as 700 and the unemployed 30; 600 out of these 700 gainfully occupied women in Faridabad are in the age group 18-59 and the remaining 100 are equally distributed in the ages below 18 and above 60. The number receiving doles is 790 and those getting a remittance is 100. The rest are all dependents and number 10,500.

43.3. In our sample of 500 households there were only 66 women who were gainfully occupied. In table 38 below is given the number and percentage of these 66, following different occupations. The average income per month from each occupation has also been noted in an adjacent column.

TABLE 38 (7.7) : OCCUPATION AND AVERAGE MONTHLY INCOME OF WOMEN EARNERS AND EARNING DEPENDENTS

occupation	number	percen-tage	average monthly income (Rs.)
(1)	(2)	(3)	(4)
doctor	1	1.5	507
nurse	1	1.5	180
teacher	6	9.1	76
tailor	9	13.7	5
basket maker	5	7.6	2
spinning	2	3.0	1
hawker	1	1.5	—
dungcake and fuel collection	13	19.7	6
labourer	6	9.1	21
domestic servant	8	12.1	8
sweeper	2	3.0	65
animal husbandry	12	18.2	11
total : working	66	100.0	26
living on doles, remittances	82	—	40
all	148	—	34

43.4.   Among the better placed women are doctors and nurses which account for 3 percent of all the gainfully occupied women, and teachers who are 9 percent of the total.   The sweepers come next in the scale of incomes and the monthly income of Rs. 65 of a sweeper follows closely behind the monthly income of Rs. 76 of a teacher. The largest group, nearly one-fifth of the total, is comprised of those having for their occupation the collection of wood and making of dung cakes for fuel.   Cow keeping and goat keeping engage another one-fifth of the total.   Tailors and domestic servants, each nearly one-eighth of the total, follow next.   One in 11 is occupied as a labourer. The remaining one-eighth are busy making baskets or spinning or hawking all of which three occupations provide an income barely exceeding rupee one per month.

CHAPTER TEN

NATURE AND INTENSITY OF EMPLOYMENT

44.1.   *Intensity of employment* : During the course of the survey information was collected regarding the occupation of each earner and earning dependent, his income and the number of days worked during the period of 90 days during December 1953 to Feberuary 1954.   This data was analysed in order to get an idea of the nature and intensity of employment. The criterion adopted for measuring the intensity of employment was the simple one of the average number of days worked per week during the 90 day period.

44.2.   The entire period of 90 days was made to correspond to a scale of 7 days to give a range of work days corresponding to average work days of $\frac{1}{4}$, 1, 2, 3, 4, 5, 6 and $6\frac{3}{4}$ per week. Associated with each of these averages is a range of one day so that 1 average work day means work between $\frac{1}{2}$ to $1\frac{1}{2}$ days per week, 2 between $1\frac{1}{2}$ to $2\frac{1}{2}$ and so on except that at the two ends of the scale the range is of $\frac{1}{2}$ day so that $\frac{1}{4}$ work day means work between 0 to $\frac{1}{2}$ day per week and $6\frac{3}{4}$ work day corresponds to a range of $6\frac{1}{2}$ to 7 work days per week.   The intensity is simply the proportion of average days worked per week expressed in decimals, the full intensity of 7 days work per week being represented by 1.00.

44.3.   Using this criterion, all the persons in the labour force of Faridabad can be classified by the intensity of their employment as shown below:

TABLE 39 (7.5) : INTENSITY OF EMPLOYMENT OF LABOUR FORCE OF FARIDABAD IN THE THREE MONTHS, DECEMBER 1953 TO FEBRUARY 1954

| work days per week | | intensity of employment | labour force | |
range	average		percentage	cumulative percentage
(1)	(2)	(3)	(4)	(5)
7 —$6\frac{1}{2}$	$6\frac{3}{4}$	1.00— .93	48.9	48.9
$6\frac{1}{2}$—$5\frac{1}{2}$	6	.92— .79	12.6	61.5
$5\frac{1}{2}$—$4\frac{1}{2}$	5	.78— .64	11.5	73.0
$4\frac{1}{2}$—$3\frac{1}{2}$	4	.63— .50	8.1	81.1
$3\frac{1}{2}$—$2\frac{1}{2}$	3	.49— .37	1.9	83.0
$2\frac{1}{2}$—$1\frac{1}{2}$	2	.36— .22	5.1	88.1
$1\frac{1}{2}$— $\frac{1}{2}$	1	.21— .08	3.4	91.5
$\frac{1}{2}$—0	$\frac{1}{4}$	.07— 0	8.5	100.0

44.4.   The cumulative percentages in col. (5) of table 39 tell at a glance what percentage of the labour force have an intensity of employment exceeding a specified level.   It is seen, for example, that 48.9 percent of all in the labour force have an average of $6\frac{3}{4}$ days of work per week or an intensity of employment exceeding 0.93.

The next figure in the column is 61.5 which is the sum of the first two entries in the previous column and shows the percentage of the labour force comprised in the two groups having (a) $6\frac{3}{4}$ average days of work per week and (b) 6 average days of work per week, represents those with an intensity of employment in excess of 0.79. If the next group of those with 5 days of work per week is included, it is seen that 73.0 percent of the labour force is accounted for who all have an intensity of employment exceeding 0.64. 81.1 percent includes all those groups who have on an average 4 or more days of work. This percentage incidentally also gives the number of those who have work for more than half the week. [·6 percent of the number represented by these groups were found 'unemployed' on the day of the survey] There is very little further addition to the percentage (1.9 percent) if we include those who have on an average 3 days of work per week. Looking at it in another way 17.0 percent are in the groups which have, on an average, 2 days of work or less per week, of which 3.4 percent have one day of work per week and 8.5 percent less than half a day of work per week. [In these three categories 94 out of 100 were without any work at the time of the survey.]

44.5. If we consider those having more than $5\frac{1}{2}$ days of work per week (i.e. employed for at least four-fifth of the time) as being fully employed; those having work between $3\frac{1}{2}$ to $5\frac{1}{2}$ days (i.e. employed for half to four-fifths of the time) as being partially employed; those having $1\frac{1}{2}$ to $3\frac{1}{2}$ days (i.e. employed for one-fifth to half of the time) as being scantily employed and those having less than $1\frac{1}{2}$ days of work (i.e. employed for less than one-fifth of the time) as being practically unemployed, we can describe the intensity of employment of the labour force in Faridabad in the following table which gives also the average monthly income in each class :

TABLE 40 (7.5) : INTENSITY OF EMPLOYMENT AND AVERAGE INCOME PER MONTH

intensity of employment		percent of labour force	income per month (Rs)
(1)		(2)	(3)
fully employed:	$5\frac{1}{2}$–7 days per week	61.5	80
partially employed:	$3\frac{1}{2}$–$5\frac{1}{2}$ days per week	19.6	39
scantily employed:	$1\frac{1}{2}$–$3\frac{1}{2}$ days per week	7.0	13
practically unemployed:	less than $1\frac{1}{2}$ days per week	11.9	2

44.6. It may be observed that the number of those who are practically unemployed in the labour force is 11.9 percent. Among them 3.4 percent had on an average one day work per week during the 90 day period. Their average income was Rs. 6 per month. They have been grouped together with those who had work for less than $\frac{1}{2}$ day per week and whose average income was nil, to form the class of 'practically unemployed'.

44.7. The group we have termed 'scantily employed' consists of two classes : 5.1 percent with 2 days of work and 1.9 percent with 3 days of work per week. The

average incomes in these classes are Rs. 10 and 21 per month respectively giving an overall average for the whole group of Rs. 13 per month.

44.8.   In the group 'partially employed' we have 8.1 percent with 4 days' of work per week and an average income of Rs. 27 per month, and 11.5 percent having 5 days of work per week and, with a monthly income of Rs. 48. (One-fifth of those having 5 work days per week are comprised of workers in Bata Shoe Factory, engaged on piece-work basis and in their case 5 days of work per week is really full employment as the factory functions only 5 days in a week).

44.9.   The group of 'fully employed' persons can again be subdivided into two classes: those having 6 days of work per week and those having $6\frac{3}{4}$.   The former accounts for 12.6 percent of the labour force with an average income of Rs. 55 per month. The latter has 48.9 percent, which mostly represent the salaried and own-account workers, having full employment.   Their average income is Rs. 87 per month.

44.10.   This analysis of the labour force indicates that the problem in Faridabad is not merely of securing employment to those found without work and seeking employment on the day of the survey, which in absolute number may be estimated as 530, but of providing jobs to another 510 who were also practically unemployed (180) or were only scantily employed (330).   [These estimates are derived in the following way: from the total number in the labour force in the sample, in each relevant intensity class (table 7.5 of Tables) the corresponding number of the unemployed seeking employment on the day of the survey was deducted and also the number in that intensity class which was found to have stable employment (see para 44.2) on the day of the survey, giving as residual the number from which relevant estimates for our use were obtained by inflating the number by a factor of 10.75 (5374/500) representing the inverse of the sampling fraction.] Jobs are thus urgently required for 1040 persons.

44.11.   Following the method indicated above, we may estimate about 140 persons in the labour force who have, with reference to the 90 days period, work on an average less than half the week, although they belong to the category of stable employment.   These together with the 'partially employed' (who account for almost one-fifth of the labour force) have got poor incomes not exceeding Rs. 40 per month. In absolute numbers they may be estimated at 1400.   In their case what is necessary is to alleviate their condition by enabling them to get employment fetching a higher income.

44.12.   Even those who may be considered to have full employment and their number may be estimated at about 3880, have among them about one-fifth who have an average income of only Rs. 55.   In their case also conditions will improve if jobs fetching higher wages can be provided.

44.13.   The remaining 3100 in this group, having an average income of Rs. 87 per month, may be assumed to be adequately settled.   These comprise just a little less than half the labour force.

44.14.   Even though these estimates in absolute numbers are subject to margins of error, they have been given here to indicate the rough dimensions of the problem.

45.1. *Nature of employment* : We may also classify the labour force by the nature of employment in the following way :

TABLE 41 (7.5) : THE LABOUR FORCE BY NATURE OF EMPLOYMENT AND AVERAGE MONTHLY INCOME

nature of employment	estimated number (in hundreds)	percent of labour force	average income Rs. per month
(1)	(2)	(3)	(4)
in the service of Faridabad Development Board	14.9	23.6	99
private industries	6.0	9.5	102
other establishments and households in Faridabad	4.2	6.6	70
own account	10.4	16.5	48
total : stable employment inside Faridabad	35.5	56.2	81
stable employment outside Faridabad	1.7	2.7	107
total : stable employment	37.2	58.9	82
relief work in Faridabad	7.8	12.4	43
other unskilled work	6.1	9.7	28
other temporary employment	6.7	10.5	13
total : temporary employment	20.6	32.6	29
unemployed seeking employment	5.3	8.5	3
total : all labour force	63.1	100.0	58

45.2. The stability of employment was judged by three criteria—intensity of work, length of continuous employment, and the level of income. Where intensity was high, generally more than an average of 5 work days per week, the period of continuous employment was long, usually more than a year; and where the income level was higher, the earner or earning dependent was placed in the category of stable employment. No rigid rules could be laid and subjective judgment played a part in this classification. The results of such analysis are given in detail in the Statistical Tables and bear their own justification.

45.3. Roughly, one could say that a little less than three-fifths of those in the labour force have stable employment; one-eighth are purely on relief work ; one-fifth have got temporary employment in trade or are engaged in unskilled labour inside or outside Faridabad; and finally about one-twelfth are completely unemployed as on the day of the survey. We discuss in the next section in considerable detail the qualifications, past occupation and income and present preferences of these unemployed, bearing in mind, however, as discussed above, that the problem of unemployment is not confined to them but extends far beyond—to those who are underemployed and even to those who, employed, have a very low income.

CHAPTER ELEVEN

THE UNEMPLOYED

46.1. *Age* : Only those who had absolutely no work and were seeking employment at the time they were interviewed in the course of the survey have been treated as 'unemployed'. The 500 sample households had 50 such persons; of these 47 are men and 3 women. The following table gives the age distribution of these unemployed :

TABLE 42 (8.1) : DISTRIBUTION OF THE UNEMPLOYED BY AGE GROUPS

age group	number	percentage
(1)	(2)	(3)
15—19	11	22
20—24	11	22
25—29	10	20
30—39	5	10
40—49	5	10
50—59	6	12
60 & above	2	4
all	50	100

46.2. Nearly two-thirds of all the unemployed are in the age groups 15-19, 20-24, and 25-29, almost equally divided in the three groups. One-fifth of all are in the age group 30-49, and one-eighth in the age group 50-59. Even persons above the age of 60 are seen to be seeking employment and their number is 4 percent of all the unemployed.

47. *Education* : We have already seen that there is a close similarity between the educational standard of the unemployed and of others who are gainfully employed. To recapitulate, 16 percent of all the unemployed are illiterates, 56 percent are barely literates, 16 percent pre-matriculates and 12 percent are matriculates or have higher qualifications. In this last group more than four-fifths are, however, only matriculates.

48.1. *Households with unemployed members* : The 50 unemployed in the sample come from 44 households. The following table gives the percentage distribution of households having at least one member unemployed by the number of unemployed members and the number of earners in the households :

TABLE 43 (8.5) : PERCENTAGE DISTRIBUTION OF HOUSEHOLDS HAVING AT LEAST ONE MEMBER UNEMPLOYED BY THE NUMBER OF UNEMPLOYED MEMBERS AND THE NUMBER OF EARNERS IN THE HOUSEHOLD.

number unemployed in the household	percentage of households having n working earners			
	$n=0$	$n=1$	$n=2$	all
(1)	(2)	(3)	(4)	(5)
one	34	43	12	89
two	7	2	–	9
three	–	–	2	2
	41	45	14	100

48.2. 89 out of every 100 households, which have one or more unemployed in it, have only one member unemployed; 9 have two members unemployed and the remaining 2 have 3 members unemployed.

48.3. 41 out of these 100 households from which the unemployed have come have no working earner and the households are at present being maintained on whatever little past savings they have, or by sale of ornaments, but mostly by help of credit from grocers etc., or through loans from relatives and friends. 45 households have one earner and 14 have two earners each and it is their income on which the unemployed of these households are being maintained.

48.4. In the following table is shown the distribution of the unemployed by income from occupation in the month of February 1954 of households to which they belong :

TABLE 44 (8.3) : INCOME OF HOUSEHOLDS WITH ONE OR MORE MEMBERS UNEMPLOYED

income level	percentage
upto Rs. 25	46
Rs. 26— 50	8
Rs. 51— 75	12
Rs. 76—100	14
Rs. 101—125	6
Rs. 126—150	8
Rs. 151—200	4
Rs. 201 & above	2
all levels	100

48.5. 46 percent of all the unemployed come from households which have an income not exceeding Rs. 25 per month. Four-fifth in this group are those who are the only earners in their households, but happen to be without a job. Two-thirds

of all the households which have any unemployed member have an income from occupation not exceeding Rs. 75 per month, one-fifth between Rs. 76 to Rs. 125 per month and the remaining one-seventh not exceeding Rs. 125 per month.

49.1.   *Last occupation* :   40 out of the 50 unemployed had a previous occupation, and the remaining 10 were students (4), sitting at home without work (3), living on doles or remittances or charity (3). The 40 who had some previous occupation may be grouped into the following classes—teaching (2), clerical (3), subordinate technical (17), subordinate administrative and executive (5), trade (1), unskilled labour (12).

49.2.   The 'subordinate technical' accounts for more than two-fifth of all the unemployed.   It includes carpenters (2), cleaners (2), cutter (1), dai nurse (1), electrician (1), factory helpers (4), motor driver (1), painter (1), sockmaker (1), tailors(2) and turner (1).

49.3.   The class 'subordinate executive and administrative' accounts for one-eighth of the total and includes 1 assistant manager, 1 watchman and 3 sweepers.

49.4.   A little less than one-third were engaged in unskilled labour of diverse kind, such as, agricultural labour (1), casual labour (4), herdsman (1), mason's assistant (3), labourers working at the stone quarry (3).

49.5.   The following table gives the distribution of the unemployed by their last occupation and monthly income therefrom :

TABLE 45 (8.2) : DISTRIBUTION OF THE UNEMPLOYED IN THE SAMPLE BY THEIR LAST OCCUPATION AND MONTHLY INCOME THEREFROM

last occupation	average income per month (Rs.) from last occupation					
	upto 25	26-50	51-75	76-100	101-150	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)
superior professional or technical	–	1	–	–	1	2
teaching	–	1	–	–	1	2
subordinate admn. and executive	–	3	1	–	1	5
assistant manager	–	–	–	–	1	1
watchman	–	–	1	–	–	1
sweeper	–	3	–	–	–	3
ministerial	–	1	1	1	–	3
subordinate technical	6	4	5	2	–	17
trade	–	1	–	–	–	1
unskilled labour	–	5	7	–	–	12
all	6	15	14	3	2	40

49.6.   15 percent of the unemployed had an income not exceeding Rs. 25 per month from their previous occupation.   38 percent had incomes ranging between Rs. 26 and 50 ; 35 percent had incomes ranging between Rs. 51 and 75, and only 12 percent had incomes exceeding Rs. 75 per month.   The unemployed thus belong to the

poorer section of the population and are mostly those who held a subordinate job in the technical line or were unskilled labourers. There are a few who were clerks or teachers, but relatively speaking their proportion is small.

49.7. When asked about their preference for jobs, the unemployed indicated a range of occupations which may be arranged in descending order of popularity as follows :

TABLE 46 (6.5) : OCCUPATIONAL PREFERENCE OF THE UNEMPLOYED

occupation preferred	percent of unemployed
unskilled labour	21
industrial worker	18
trade	16
clerical	11
artisan	10
own enterprise	8
peon and watchman	8
unspecified	8
all occupations	100

49.8. Two-fifths of the unemployed would be glad to get a job either as an unskilled labourer or as an industrial worker. About a sixth prefer to establish themselves in trade and half that number in some other enterprise of their own. They hope to be able to do so if Government extended financial assistance to them. One-tenth desire to be artisans and the same number want to be absorbed in clerical posts. A sizeable proportion, almost one-twelfth, prefer a job as a peon and watch man. About the same number have no preference to show.

Chapter Twelve
PATTERN OF CONSUMER EXPENDITURE

50.1.   The ultimate purpose of all the economic activities we have described is, of course, to give their means of livelihood to the people of Faridabad.   Every household has to provide for itself its requirement of food and clothing and various other goods and services.   If it is a prosperous household it can manage to eat better, dress better and avail of many goods and services; if its income is poor, it has no choice but to live with very little. In the present survey an attempt was made to study the pattern of expenditure of the households in a detailed manner.   The period for which information was gathered for each household was the month of February 1954 and this was uniformly the same for all the households irrespective of the date when they were actually visited for the enquiry.   Data was collected by skillful and patient interrogation of the head of the household or any other member of the household in a better position to furnish information relating to the expenditure on consumption for the household.   The table below shows the per capita consumer expenditure for the month of February 1954 for all the sample households in Faridabad expressed in rupees and in percentages.   It also gives the pattern of consumer expenditure of persons belonging to unregistered households separately.

TABLE 47 :   PER CAPITA CONSUMER EXPENDITURE IN ALL HOUSEHOLDS AND IN UN-REGISTERED HOUSEHOLDS DURING FEBRUARY 1954

sl. no.	items of consumption	per capita consumer expenditure per month			
		all· households		unregistered households	
		in Rs.	in percentage	in Rs.	in percentage
(1)	(2)	(3)	(4)	(5)	(6)
1	all cereals	6.06	25.8	5.69	13.4
2	pulses and products	0.64	2.7	0.79	1.9
3	milk and products	2.74	11.7	5.91	13.9
4	vegetables	1.04	4.4	2.05	4.8
5	fruits and nuts	0.38	1.6	1.12	2.6
6	meat, fish and eggs	0.28	1.2	0.92	2.2
7	oils and products	1.51	6.5	1.72	4.1
8	sugar and gur	1.26	5.3	1.33	3.1
9	salt and spices	0.43	1.8	0.61	1.4
10	beverages and refreshments	0.64	2.7	1.12	2.7
11	total : food items	14.98	63.7	21.26	50.1
12	tobacco and products, *pan, supari*	0.42	1.8	0.89	2.1
13	drugs and intoxicants	0.09	0.4	0.11	0.3
14	fuel and light	1.51	6.4	2.04	4.8
15	clothing and footwear	2.39	10.2	4.97	·11.7
16	bedding etc.	0.13	0.5	0.17	0.4
17	furniture and equipment	0.15	0.6	0.19	0.4
18	utensils	0.13	0.5	0.12	0.3
19	ornaments	0.02	0.1	0.06	0.1
20	amusements and sports	0.09	0.4	0.55	1.3
21	books and education	0.40	1.7	0.55	1.3
22	medicines	0.45	1.9	1.23	2.9
23	toilets	0.40	1.7	0.78	1.8
24	other miscellaneous	0.73	3.1	1.78	4.2
25	conveyance	0.44	1.9	2.38	5.6
26	ceremonials	0.15	0.7	0.21	0.5
27	services	0.44	1.9	1.57	3.7
28	rents	0.42	1.8	2.01	4.7
29	taxes	0.16	0.7	1.59	3.8
30	total : non-food items	8.52	36.3	21.20	49.9
31	total : all items	23.50	100.0	42.46	100.0
32	no. of households	500		56	
33	no. of persons	2218		206	

50.2.   In the population as a whole, a little less than two-third (63.7 percent) of the total expenditure was incurred on food items and a little more than one-third (36.3 percent) on non-food items.   More than one-fourth of all the expenditure or more than 40 percent of the total expenditure on food items was spent on cereals.   For every hundred rupees spent on food items the proportion on different individual items of food is given in table below :

TABLE 48 : PER CAPITA EXPENDITURE ON DIFFERENT ITEMS OF FOOD AS PERCENT OF TOTAL EXPENDITURE ON FOOD

food items	percentage of total expenditure on food
all cereals	40.4
milk and milk products	18.3
oil and products	10.1
sugar and gur	8.4
vegetables	6.9
pulses and products	4.3
beverage and refreshment	4.3
salt and spices	2.9
fruits and nuts	2.5
meat, fish and eggs	1.9
all food items	100.0

50.3.   Similarly for the non-food items the distribution among the selected items in order of their importance is as follows :

TABLE 49 : PER CAPITA EXPENDITURE ON DIFFERENT NON-FOOD ITEMS AS PERCENT OF TOTAL EXPENDITURE ON NON-FOOD ITEMS

non-food items	percent of total expenditure on non-food items
clothing and footwear	28.0
fuel and light	17.7
medicines	5.3
services	5.2
conveyance	5.2
tobacco, *pan, supari*	4.9
rent	4.9
toilets	4.7
books and education	4.7
all the rest	19.4
all non-food items	100.0

50.4.   Persons in unregistered households live twice as better than the general population, judged by their per capita expenditure.   The total monthly expenditure per capita in February was Rs. 42.5 in their case compared with Rs. 23.5 of the general population.   Food, which absorbed almost two-thirds of the budget of an average individual in the general population, accounted for only half the total expenditure of an average person in the unregistered household.   With only half of his budget, he could, however, spend on food one and a half times as much in absolute amount as an individual in the general population.   In absolute terms again, he could afford to spend $2\frac{1}{2}$ times as much as the other on non-food items, thus on the whole enjoying a much higher standard of living.

50.5.   *Consumption at different levels of expenditure* :   The relative proportion of expenditure on food items and non-food items shows significant change for households with different levels of expenditure.   The households of Faridabad may be classified according to their level of expenditure as follows:

TABLE 50 : PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY LEVEL OF MONTHLY CONSUMER EXPENDITURE

expenditure level per month	percentage of households	average size of households	percentage of persons in the households
(1)	(2)	(3)	(4)
upto Rs. 25	3.4	1.06	0.8
Rs. 26— 50	12.2	2.43	6.7
Rs. 51— 75	23.4	3.91	20.7
Rs. 76—100	20.2	4.59	20.9
Rs. 101—125	14.6	4.79	15.8
Rs. 126—150	9.4	5.21	11.0
Rs. 151—200	10.0	6.12	13.8
Rs. 201 & above	6.8	6.74	10.3
all levels	100.0	4.44	100.0

50.6.   As the level of expenditure of the household rises there is a tendency for the proportion on food items becoming smaller.   This is illustrated in the following table :

TABLE 51 : CHANGE IN PERCENTAGE OF EXPENDITURE ON FOOD WITH CHANGE IN
LEVEL OF CONSUMER EXPENDITURE

level of household consumer expenditure per month	percentage of expenditure	
	on food items	on non-food items
(1)	(2)	(3)
Rs. 8–25	80.2	19.8
Rs. 26–50	72.6	27.4
Rs. 51–75	74.7	25.3
Rs. 76–100	70.2	29.8
Rs. 101–125	63.2	36.8
Rs. 126–150	60.4	39.6
Rs. 151–200	57.9	42.1
Rs. 200 and above	51.8	48.2

50.7.   With increase in the level of expenditure of the household, per capita expenditure on cereals is reduced even more steeply than the proportion of expenditure on food items.   For example, while at a level of Rs. 8-25 the amount spent on cereals is 45 percent of the expenditure on all the food items, at an expenditure level of Rs. 201 and more, the expenditure on cereals is only 29 percent of the expenditure on all food items.   Milk and milk products which represent only about one-eighth of the expenditure on all food items in the budget of households having an expenditure between Rs. 8-25 per month, account for nearly double that proportion in the households with an expenditure level exceeding Rs. 200 per month.   Similarly, the proportion of vegetables is seen to increase from one-sixteenth to about one-eleventh of the expenditure on food items.   Fruits and nuts which constitute less than $\frac{1}{2}$ percent of the food expenditure of households with expenditure level of Rs. 8-25 account for one-twentieth of the amount spent on food items by households with expenditure level of Rs. 201 and more.   Thus the pattern of food in households with higher levels of expenditure is considerably different and shows a distinct improvement in the composition.

51.1.   Table 50 shows, however, that the households with larger expenditure levels are also those which on the average have more members.   If we were therefore interested to study how the pattern of per capita consumption varies at different levels of per capita total monthly expenditure, the households have to be grouped not according to their total monthly expenditure but in terms of the per capita total monthly expenditure, obtained by dividing the total household expenditure by the number of persons constituting the household.   The results of such an analysis are summarised in the following table :

TABLE 52 : PER CAPITA CONSUMER EXPENDITURE PER MONTH IN RUPEES FOR DIFF-
ERENT LEVELS OF MONTHLY PER CAPITA CONSUMER EXPENDITURE.

(reference period : February 1954)

sl. no.	items of consumption	per capita consumption in rupees per month for February 1954 at levels of per capita monthly total expenditure								
		5–10	11-15	16-20	21-25	26-30	31-40	41-60	61–	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	all cereals	4.32	5.39	5.91	6.05	6.83	7.14	7.46	7.68	6.06
2	pulses & products	0.32	0.48	0.59	0.70	0.73	0.82	1.10	1.19	0.64
3	milk & products	0.67	1.25	2.22	2.88	3.33	4.11	5.94	11.50	2.74
4	vegetables	0.31	0.66	0.78	1.10	1.14	1.58	2.04	4.30	1.04
5	fruits and nuts	0.05	0.07	0.17	0.25	0.46	0.68	1.14	3.81	0.38
6	meat, fish and eggs	0.01	0.12	0.16	0.21	0.35	0.36	0.90	2.22	0.28
7	oils and products	0.52	1.09	1.37	1.62	1.01	2.06	2.36	3.35	1.51
8	sugar and gur	0.51	0.88	1.12	1.38	1.59	1.71	2.05	2.44	1.26
9	salt and spices	0.18	0.30	0.38	0.43	0.53	0.50	0.65	1.47	0.43
10	beverages and refresh- ments	0.12	0.31	0.44	0.64	0.66	0.90	1.93	3.20	0.64
11	total : food-items	7.01	10.55	13.14	15.26	17.53	19.86	25.57	41.16	14.98
12	tobacco & products, pan etc.	0.10	0.23	0.24	0.37	0.60	0.54	1.28	2.05	0.42
13	drugs and intoxicants	—	0.01	0.03	0.05	0.06	0.13	0.31	1.70	0.09
14	fuel and light	0.73	1.09	1.34	1.50	1.70	1.95	2.47	4.55	1.51
15	clothing and foot-wear	0.21	0.69	1.14	2.28	3.04	4.84	7.01	15.17	2.39
16	bedding etc.	—	—	0.02	0.20	0.29	0.15	0.51	0.72	0.13
17	furniture and equip- ments	—	0.03	0.01	0.09	0.24	0.49	0.86	0.26	0.1^0
18	utensils	—	0.02	0.07	0.11	0.19	0.22	0.48	0.74	0.13
19	oranments	—	—	—	—	—	—	—	1.00	0.02
20	amusements and sports	0.00	0.00	0.01	0.05	0.06	0.14	0.26	1.90	0.09
21	books and education	0.09	0.10	0.20	0.43	0.51	0.90	1.68	0.74	0.40
22	medicines	0.01	0.07	0.19	0.34	0.52	0.91	1.22	4.59	0.45
23	toilets	0.15	0.22	0.31	0.41	0.49	0.43	0.85	1.98	0.40
23	other miscellaneous	0.20	0.37	0.49	0.75	0.82	0.97	1.34	5.34	0.73
25	conveyance	0.01	0.06	0.16	0.37	0.60	0.52	0.72	6.92	0.44
26	ceremonials	0.00	0.00	0.05	0.05	0.24	0.50	0.70	0.54	0.15
27	services	0.08	0.16	0.24	0.33	0.51	0.70	0.67	5.10	0.44
28	rents	0.11	0.14	0.20	0.42	0.37	0.57	0.83	5.13	0.42
29	taxes	0.00	—	0.01	0.01	—	0.04	0.02	6.02	0.16
30	total : non-food items	1.69	3.19	4.71	7.76	10.24	14.00	21.21	64.45	8.52
31	total : all items	8.70	13.74	17.85	23.02	27.77	33.86	46.78	105.61	23.50
32	no. of persons	158	479	593	337	269	208	120	54	2218
33	no. of households	23	89	121	81	65	58	38	25	500

51.2.   The overall average per capita expenditure in Faridabad for the month of February 1954 was Rs. 23.5 and we may therefore treat the level of per capita monthly expenditure of Rs. 21-25 as the average in relation to which the levels of expenditure of Rs. 5-10, Rs. 11-15 and Rs. 16-20 are below average and levels of expenditure of Rs. 26-30, Rs. 31-40, Rs. 41-60 and Rs. 61 and above are above average.   The households and persons belonging to these households may be accordingly grouped as below :

TABLE 53 (9.3) :   PERCENTAGE OF HOUSEHOLDS AND PERSONS BY LEVEL OF PER CAPITA EXPENDITURE PER MONTH

per capita expenditure rupees per month		number of households	percent	number of persons	percent
range	mean				
(1)	(2)	(3)	(4)	(5)	(6)
Rs. 5—10	8.7	23	4.6	158	7.1
11—15	13.7	89	17.8	479	21.6
16—20	17.9	121	24.2	593	26.7
sub-total : below average		233	46.6	1230	55.4
Rs. 21—25	23.0	81	16.2	337	15.2
Rs. 26—30	27.8	65	13.0	269	12.1
31—40	33.9	58	11.6	208	9.4
41—60	46.8	38	7.6	120	5.4
61—	105.6	25	5.0	54	2.5
sub-total : above average		186	37.2	651	29.4
all levels	23.5	500	100.0	2218	100.0

51.3.   152 out of 1000 persons in Faridabad may be considered to be more or less enjoying the average level of living, 294 living better than the average and 554 worse.   Of the latter, nearly half are worse than the average by one-fourth, another two-fifths by more than two-fifths and the remaining one-eighth by two-third.   Of those who are spending more than the average, two-fifths are on a level higher by one-fifth, and one third by more than two-fifths.   Between one-fifth and one-sixth have double the average expenditure and the remaining one-twelfth, four and half times the average.

51.4.   In the lowest level of per capita expenditure Rs. 5-10, food accounts for 80.6% of the total expenditure and cereals alone represent 49.7 percent.   At the highest level, that is above Rs. 60, food takes up only 39.0 percent of the total expenditure and cereals account for only 7.3 percent.   Generally as the level of per capita expenditure rises, the relative importance of expenditure on cereals, pulses, oils, salts and spices etc. is reduced while that on milk and milk products, vegetables, meat, fish and eggs, fruits and nuts etc. is increased. Similarly among non-food items, clothing and footwear, medicines, conveyance, services, rents and taxes etc. assume greater importance in the budget as the level of expenditure rises.

52. *Food consumption* (*in quantities*) :   In the table 54 below is shown the per capita consumption of food items per month in seers for certain selected items :

TABLE 54(9.5) : PER CAPITA CONSUMPTION OF SELECTED FOOD ITEMS IN FEBRUARY 1954, BY QUANTITIES (IN SEERS)

item of consumption	consumption (in seers)
(1)	(2)
wheat	11.74
other cereals	2.38
all cereals	14.12
pulses and products	0.99
milk and products	5.01
vegetables	3.49
fruits and nuts	0.49
meat, fish and eggs	0.18
oils and products	0.71
sugar and gur	1.58
salt and spices	0.51
no. of households	300
no. of persons	1332
household size	4.44

53.1. *Home supply* :   A portion of the consumer expenditure of some of the households is accounted for by the imputed value of home produce such as milk, vegetables or fuel.   The number and percentage of households having home supply of milk, vegetables and fuel in our sample of 300 households is shown below :

	number	percentage
milk	42	14
vegetable	6	2
fuel	79	26

53.2. The households which had home supply of milk showed an expenditure of this item almost double in amount of the average expenditure in the households without such home supply.   For vegetables and fuel it did not appear to make any difference in the consumption of these items whether the household had home supply of them or not.

53.3. It was observed that households having a home supply of milk derive 88 percent of their total consumption from home supply.   Households which obtained their own fuel by collecting cow dung or twigs etc., could supply their needs to the extent of 62 percent.   Households which had a home supply of vegetables had to supplement this source by purchase of more than two-thirds of their total requirements.

54. *Fixed shops and vendors* : An interesting aspect is the relative role played by vendors and fixed shops in the supply of household requirements. It was found in Faridabad that 72 percent of the households purchase all their requirements from fixed shops only and the remaining 28 percent patronise vendors also. The average amount of purchases made by these households from vendors was Rs. 8 in the month of February and the average amount of purchases per household from the fixed shop was Rs. 96.

55. *Purchases from residents and non-residents* : Disregarding the classification of vendors and fixed shops, but introducing in its place another one of residents and non-residents, we find that 78 percent of all households made their purchases from residents of Faridabad only and the remaining 22 percent both from residents and non-residents. The households which made purchases from non-residents of Faridabad on an average bought things worth Rs. 14 during the month of February. The households which made purchases from residents of Faridabad— and those included all the households— bought things worth on an average Rs. 95 per household. The purchases of consumer goods per household during the month of February amounted to Rs. 98 on an average.

56. The survey has shown that during the month of February the average consumer expenditure per household was Rs. 104 out of which Rs. 66 was spent on food items and the remaining Rs. 38 on non-food items. We shall see in the next Chapter how this expenditure was met by the households of Faridabad.

CHAPTER THIRTEEN

INCOME AND EXPENDITURE

57.1.   An attempt was made in the present survey to ascertain how the households meet their expenditures.   We have already seen that each of the 500 households in the sample detailed information was collected about their consumer expenditure during February 1954.   Information was collected at the same time as to how the expenditure was met out of the receipts of the household for the same period.

57.2.   It was thought that a period of one year might be better to study this question of the balance between the income and expenditure of households.   Accordingly an additional sub-sample of 100 households was investigated on a more intensive schedule.   In the present section we propose to discuss some of the results obtained.

57.3.   Our 500 sample households may be classified into four groups according to the nature of employment of the principal earner of the household.

	percent of households
households with principal earners—	
in stable employment	54.8
in temporary employment	24.0
getting doles and remitances	17.6
unemployed	3.6

For each of these four types of households we shall study the source of the receipts and compare the total receipts with the expenditure.

57.4.   The receipts of the households are derived from one or more of the following sources :

1)   income from occupation (including that derived from home produce)
2)   Government doles
3)   remittances from relations and friends and incomes from other sources such as, pensions, rents of lands and houses
4)   sale of assets, such as ornaments
5)   withdrawals from past savings
6)   loans in cash or credit from traders.

57.5   The first three alone constitute, what may be normally called, the income of the household.   (Government dole has been counted as proper income in the context of Faridabad as dole to destitute widows, the infirm and the disabled are special features of the township and constitute regular source of income).   The other three components of the receipts are altogether of a different nature and may not be included in income.

57.6. For these four types of households, the average receipts from different sources during February 1954 are as shown in table 55.

TABLE 55 (10.1) :   AVERAGE RECEIPTS OF FOUR TYPES OF HOUSEHOLDS DURING FEBRUARY 1954

sl. no.	source of receipts	average receipts (February) of households with principal earner									
		in stable employment		in temporary employment		getting Govt. doles or remittances		un-employed		in all households	
		amount	(percent)	amount	(percent)	amount	(percent)	amount	(percent)	amount	(percent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	occupation (principal & subsidiary)	109	(74)	47	(45)	6	(8)	3	(4)	72	(60)
2	Govt. doles	—	—	1	(1)	37	(51)	1	(1)	7	(6)
3	remittances & other sources	3	(2)	1	(1)	11	(15)	13	(17)	4	(3)
4	sub-total	112	(76)	49	(47)	54	(74)	17	(22)	83	(69)
5	past savings	9	(6)	12	(12)	2	(3)	8	(11)	9	(7)
6	sale of assets	3	(2)	14	(13)	2	(3)	7	(9)	5	(4)
7	loans	23	(16)	29	(28)	15	(20)	44	(58)	24	(20)
8	sub-total	35	(24)	55	(53)	19	(26)	59	(78)	38	(31)
9	all sources	147	(100)	104	(100)	73	(100)	76	(100)	121	(100)
	percent of households		(54.8)		(24.0)		(17.6)		(3.6)		(100.0)

57.7. The sub-totals in row 4 give the portion of the total receipts which we have considered as the normal income of the households. It may be observed that for households with principal earner in stable employment, this income consitutes more than three-fourth (76 percent) of the total receipts. For households with principal earner in temporary employment it constitutes less than half (47 percent) and in households with principal earner getting Government doles and remittances, three-fourth (74 percent) of the total receipts. The households in which the only earner is unemployed have naturally very little income. In their case it represents only one-fifth to one-fourth (22 percent) of the total receipts.

57.8. This income is almost wholly derived from the principal or subsidiary occupations in the first two cases. In the case of households mainly living on doles and remittances, the income from occupation represents only one-ninth of the total income. Earnings from occupation represent not more than one-sixth of the total income of households in which the principal earner is unemployed and is mainly due to the earnings of the earning dependents of the households. Taking all the households together, the average income works out to Rs. 83 which is only 69 percent of the total average receipts of the households which amount to Rs. 121.

119

57.9.   The average receipts of stable employment households is double that of households which are being maintained on doles or remittances or have their principal earners unemployed; it is nearly one and half times the average receipts of temporary employment households.

58.1.   The other portion of the receipts, which is comprised of past savings, sale of assets and loans, plays a more or less important part in different types of households.   Its main function is to fill the gap between the expenditure of the household and its normal income.   For each of the four types of households, the average consumer expenditure during February, the average income in February and the difference between the two i.e., the 'gap' in the budget, as studied in a special sixth sample of 100 households, has been shown in the following table :

TABLE 56 : GAP BETWEEN THE MONTHLY INCOME AND EXPENDITURE OF EACH OF THE FOUR TYPES OF HOUSEHOLDS

sl. no.	households with principal earner	average expenditure in rupees per month	average income in rupees per month	amount of gap in rupees	gap as percent of expenditure
(1)	(2)	(3)	(4)	(5)	(6)
1	in stable employment	118	112	— 6	— 5
2	in temporary employment	89	49	—40	—45
3	getting Government doles & remittances	74	54	—20	—27
4	unemployed	69	17	—52	—75
5	all households	102	83	—19	—19

58.2.   It may be observed that stable employment households, considered as a whole, had an average expenditure of Rs. 118, an average income of Rs. 112 and thus a gap between the two of Rs. 6, representing a deficit of only 5 percent in the budget.   In temporary employment households the gap was much wider, to the extent of 45 percent of the total expenditure of Rs. 89.   The dole and remittance households fared better but not too well.   Their average expenditure was Rs. 74 as against an average income of Rs. 54 leaving a gap of Rs. 20, representing 27 percent of the total expenditure.   The unemployed households naturally showed the biggest gap and the average income of Rs. 17 was only a small portion of the average expenditure of Rs. 69, leaving a gap of Rs. 52 or 75 percent of the total expenditure.   All the households taken together showed an average expenditure of Rs. 102, an average income of Rs. 83 and a gap of Rs. 19 to be filled by withdrawals from past savings, sale of assets, loans in cash or more generally, credit from shopkeepers.

58.3.   Now, it is obvious that the income should atleast balance the expenditure over a period of time or else the household would have to live by the exploitation of its past (i.e., encroaching on its savings, if any) or through the burdening of its future (i.e., accumulating debts).   Neither of these expedients may be relied upon for long and a continuing gap between income and expenditure must indicate an unstable situation.

58.4. We have so far discussed the households group by group. This does not give an idea of the differences within a group. For example, the deficits of many households may be more than offset, in the group as whole, by the heavy surpluses of a few. The low gap for the group as such may to some extent suggest a picture rosier than reality. A better way of looking at the problem is to see to what extent individual households are able to meet their expenditure with their normal income. The results of the analysis of the incomings and outgoings of the sample of hundred households which was investigated for this special purpose are given in table 57.

58.5. The reference period is one year ending March 1954. The four types of households were classified according to the extent of difference between their consumer expenditure during the year and the total income during the same period, income being understood in the sense already explained. A household was classified as having a balanced budget, if its income was in excess or short of the total expenditure by 5 percent of the latter, excess of expenditure over income by more than 5 percent represented a deficit budget and was classified under any of the three groups (6-10 percent, 11—30 percent and over 30 percent) denoting the extent of deficit expressed as percentage of the total expenditure. Similarly the excess of income over expenditure by more than 5 percent of the latter meant a surplus budget and the household was classified, as before, according to the extent of the surplus.

TABLE 57 : STABILITY OF HOUSEHOLD BUDGETS FOR ONE YEAR ENDING MARCH 1954, BASED ON A SAMPLE OF 100 HOUSEHOLDS

sl. no.	households with principal earner	number of households with deficit, balanced or surplus budgets							
		deficit (−)			balanced at ±5%	surplus (+)			all classes
		31%−	11% to 30%	6% to 10%		6% to 10%	11% to 30%	31%−	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	in stable employment	11	12	5	22	2	4	4	60
2	in temporary employment	10	4	2	5	−	1	−	22
3	getting Govt. doles and remittances	−	1	1	13	−	−	1	16
4	unemployed	2	−	−	−	−	−	−	2
5	all households	23	17	8	40	2	5	5	100

58.6. It may be observed that nearly nine-tenth of the dole and remittance households have a balanced or surplus budget. More than half (53 percent) of the stable employment households and between one-fourth and one-third (28 percent) of temporary employment households may be considered to have a balanced or surplus budget. Among the unemployed households naturally all have deficit budgets. On the whole taking all types of households and extending the criterion of balance by another 5 percent, it may be seen that half the households have their budgets balanced

within 10 percent of the total expenditure; one-tenth have incomes exceeding expenditure by more than 10 percent of the total expenditure and the remaining two-fifths are seen to have expenditure exceeding income by more than 10 percent of the expenditure.

58.7.   The picture emerging from this brief analysis is a disturbing one and shows that at least half the number of households have to rely on sources other than their normal income to enable them to maintain their present pattern of expenditure. This pattern, as we have seen, is not in itself indicative of any high standard of living.

58.8.   There are, however, reasons for not taking these results at their face value.   The tendency for under-statement of income and exaggeration of expenditure has been noticed in many a survey of this nature before.   In the present survey also there is evidence of exaggeration atleast in regard to the role of past savings, sale of assets and loans in the household budget.

58.9.   If we refer back to tables 55 and 56, we find that stable employment households have an average income of Rs. 112 as against an average expenditure of Rs. 118.   There is thus a gap of only Rs. 6 to be filled.   But according to the information vouchsafed by the households the receipts from past savings (Rs. 9), sale of assets (Rs. 3) and loans (Rs. 23), supposed to be meant to fill up this gap, amount to Rs. 35. In this case, obviously Rs. 29 were in excess of the need.   Similarly for households in temporary employment, the gap is only of Rs. 40, while the receipts from past savings, sale of assets and loans have been stated to amount to Rs. 53.   Here again there appears evidence of exaggeration.   The gap in the case of dole and remittance households is what should be expected if the average income and expenditure are taken into account and the same is more or less the case for the unemployed households.   These two types of households have at least supplied consistent information.

CHAPTER FOURTEEN

HEALTH AND HOUSING

59. Faridabad has a well-developed system of health services and is reported to have comparatively reliable records of vital events. This gave encouragement to introduce in the survey schedules items (more in the nature of test questions) seeking information on births and deaths during one year from March 1953 to February 1954 in the sample households and illnesses, their cause and duration during 3 months, December 1953 to February 1954.

60.1. *Births* : In all 60 births were recorded in 500 households comprising a sample population of 2218. Males were born in excess of females in the ratio of 1000 females to 1400 males. The gross birth rate works out to 27.1 (± 3.5) per thousand of population. During the same period the records of Faridabad township show the total number of births as 616 (for a population of nearly 24,000) giving a gross birthrate of 26. The survey results are thus in close accord with independent data.

60.2. As the age of the mother was known in each case as well as the total number of mothers in each age group in the sample, the relative number of births per one thousand mothers in any age group could be worked out which gives the following interesting results :

TABLE 58 : LIVE BIRTHS DURING ONE YEAR BY AGE OF MOTHER AND SEX OF INFANT IN THE SAMPLE OF 500 HOUSEHOLDS COMPRISING 2218 PERSONS IN FARIDABAD TOWNSHIP

age of mother	married females in the age group	births			births per 1000 married females
		males	females	total	
(1)	(2)	(3)	(4)	(5)	(6)
upto 14	5	—	—	—	—
15—19	74	7	6	13	176
20—24	92	9	9	18	196
25—29	70	9	5	14	200
30—34	40	5	2	7	175
35—39	38	4	1	5	132
40—44	33	—	2	2	61
45—49	32	1	—	1	31
50—	41	—	—	—	—
all ages	425	35	25	60	141

61. *Deaths* : The 500 households in the sample gave a total figure of 23 for deaths during the year March 1953 to February 1954. The crude death rate thus works out to 10.4 (± 2.1) per mille. For the corresponding period the total number

of deaths recorded in the health centres and in the hospitals was 241 which gives for a population of 24,000 a death rate of 10.0 per mille, thus showing close agreement with the results of the survey.

62.1. *Sickness* : Information on sickness related to a period of only 3 months, December 1953 to February 1954, as it was felt that informants may not be able to give correct information if the reference period was as long as one whole year. The definition of sickness was the same as in vogue in National Sample Survey.

62.2. 185 out of the sample population of 2218 were reported as having been sick for a short or long duration during 90 days under reference. The following table shows the sicknesses and their duration during the period :

TABLE 59 : DURATION OF SICKNESS DURING 3 MONTHS OF 185 PERSONS IN A SAMPLE OF 500 HOUSEHOLDS COMPRISING 2218 PERSONS IN FARIDABAD

sickness	days of sickness						
	0-3	4-7	8-15	16-30	31–	all	percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
malaria	6	19	12	7	3	47	25.4
pneumonia and other fevers	2	7	8	2	4	23	12.4
stomach ailments	2	6	7	5	10	30	16.2
respiratory	1	2	–	2	6	11	6.0
old age	–	1	3	1	3	8	4.3
all others	2	12	19	12	21	66	35.7
all sicknesses	13	47	49	29	47	185	100.0

62.3. It will be seen that malaria alone was responsible for more than a fourth of all the sicknesses. Next in importance were stomach ailments of various kinds which accounted for one-sixth of all sicknesses. Pneumonia, typhoid and other fevers constituted another one-eighth of the sicknesses. Apart from these, of some importance were respiratory diseases accounting for one-sixteenth, and old age accounting for one-twentythird of all sicknesses. All the others put together were just over one-third.

62.4. As regards the duration of sickness, 1 in 14 was ill only for a period of 3 days or less; one in 4 for a period between 4 and 7 days; about the same number for a period between 8 to 15 days; one in 6 for a period between a fortnight and a month and 1 in 4 for more than a month during the period of 90 days.

62.5. The proportion of earners and earning dependents among those who fell sick was 40 percent. One in every 9 of the earners and earning dependents of Faridabad was sick sometime or other during the period of 3 months. These persons lost nearly 30 percent of their working days because of sickness during this period. Taking into account all the earners and earning dependents, the loss in mandays may be put at 3.3 percent.

HOUSING

63.1. While considering the housing conditions in Faridabad, one has to bear in mind that it is a new township where all houses have been constructed by the Farida-bad Board for being let out to the displaced persons.

63.2. *House type* : Although it was known that almost all the houses in Faridabad are of a standard pattern some information was collected regarding housing conditions specially with reference to water supply, lighting, covered area of accommodation, occupancy status of the household. The results which are presented in the statistical tables confirm that 97 percent of all the houses are of the same type with plinth made of bricks with plastered brick walls and roofs of cement or brick tiles on wooden battens. These are what may be called 'pucca' houses. A very small number, however, is of houses which may be called 'semi-pucca' (with brick plinth, walls of brick, corrugated iron sheets or wood and roof of corrugated iron sheets), and even a smaller number of temporary shelters made of tents.

63.3. *Occupancy status* : 95 percent of the households were living in houses on a rental basis, 4 percent as owners and 1 percent as subtenants.

63.4. *Covered area* : One fifth of the houses have a covered area of less than 300 sq.ft., three-fourths between 300 to 600 sq. ft. and a small proportion (one in twenty-two an area exceeding 600 sq. ft.).

63.5. *Rooms* : One-fifth (19 percent) of the houses have only one room; three-fourths (74 percent) have two rooms and the remaining (7 percent) have three or four rooms.

63.6. *Water supply* : 93 percent of households derive their water supply from community water taps; 6 percent have taps in their own houses and 1 percent have private wells.

63.7. *Latrines* : 63 percent of households have latrines for individual use, 16 percent have to share this convenience with one other household and 12 percent with two or more households. The remaining 9 percent have no use for latrines and apparently take advantage of the wide open spaces in which the township abounds.

CHAPTER FIFTEEN

COMPARISON WITH OLD FARIDABAD

64.1. In the preceding Chapters, we have discussed various aspects of the economy of Faridabad township and made an attempt to give an idea of the level of living of its population. It is, however, difficult to see the import of these facts if studied in isolation for Faridabad alone. Some yardstick is necessary with which to assess the significance of the figures. To serve for comparison, a separate study was made of 120 households (using a stratified simple random plan) out of the 1505 households in the neighbouring town of old Faridabad which has a population of 7000 persons. The study followed the pattern of the investigation in the new township and the material collected was comparable in scope and reliability.

64.2. The reason for selecting the town of Old Faridabad for the purpose of this comparative study was its proximity to the new township which fact rendered it possible to include this additional investigation in the programme of field work of investigators conducting the survey of the new township. Actually the old town is much smaller than the new township having a population only 30 percent of the latter. In character also the old town is different; it is semi-rural and not industrial which is the pattern on which the new township is sought to be developed. A very useful study would be a comparison between the economy of the new township and that of an established industrial town of the type of Chittaranjan. A socio-economic survey of Chittaranjan town has, in fact, recently (November 1954) been undertaken by the Indian Statistical Institute in connection with certain studies relating to planning for national development and the results when available should be very interesting by way of comparison.

64.3. In this Chapter we shall make a comparison of the populations of old town and the new township and discuss some of the more important results to see how far conditions in the two towns are alike or different, bearing in mind that comparisons have to be made with reservations in view of the specific peculiarities of each town. The purpose of the comparison, it may be stressed, is merely to present the economic facts of the new township against a background of conditions prevailing in some other area so as to help in understanding their proper significance.

65.1. *Demographic* : Unlike the new township where all but four percent are migrant households, the old town has 55 percent households of local origin and 41 percent migrant households.

65.2. The average household is somewhat larger than in the new township but the difference is small, 4.66 and 4.44.

65.3. There is a much higher proportion of infants and children, 20.2 percent, compared with 13.1 percent of the township; the proportion of boys and girls is smaller, 26.8 percent, as compared with 29.1 percent of the township; so also of young persons who number only 27.3 percent compared to 33.4 percent in the new township. The middle-aged (16.4 percent) and elderly persons (9.3 percent) are in about the same proportion as in the new township.

65.4. The relative proportions of the single, married and widowed persons are strikingly similar in the two populations.

66.1. *Education* : There is considerable difference, however, in the pattern of education. Illiterate males in old Faridabad are double their proportion in the new township and include more than half (50.6 percent) of all the males. Between one-third and two-fifths (36.5 percent) are barely literates and only one in nine (11 percent) has read beyond the middle stage among the males. In the new township these last account for more than one-sixth (18.3 percent) of the males. Similar is the case with females except that the relative differences are less.

66.2. Matriculates and graduates are 1 in 30 in the population of new township but only 1 in 50 in the population of old Faridabad.

66.3. An interesting comparison is the proportion of illiterates among boys and girls (age 5 to 14 years). This is shown below :

TABLE 60 : RELATIVE PROPORTION OF ILLITERATES AMONG BOYS AND GIRLS IN OLD FARIDABAD AND THE NEW TOWNSHIP

age group	number of male illiterates as percent of all males in the age group		number of female illiterates as percent of all females in the age group	
	old Faridabad	new township	old Faridabad	new township
(1)	(2)	(3)	(4)	(5)
5— 9	51	34	71	46
10—14	24	4	33	19
5—14	39	17	52	31

The effect of better opportunities of schooling in the new township is evident from the figures in the above table.

67. *Economic Status* : The earners and earning dependents are 33.7 percent and dependents 66.3 percent in old Faridabad. The earning dependents (9.3 percent) are between 2½ to 3 times as many in relative proportion as their number in the new township (3.4 percent) which may be expected because of the partly rural character of the old town.

68.1.   *Labour Force* :   A comparison of the labour force in the two populations is shown below :

TABLE 61 :   COMPARISON OF LABOUR FORCE IN OLD FARIDABAD AND THE NEW TOWNSHIP

	old Faridabad			new township		
	males	females	total	males	females	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
gainfully occupied	44.6	16.1	30.6	43.4	5.9	24.3
seeking employment	1.4	—	0.7	4.4	0.3	2.3
all labour force	46.0	16.1	31.3	47.8	6.2	26.6
not in labour force	54.0	83.9	68.7	52.3	93.8	73.4
all	100.0	100.0	100.0	100.0	100.0	100.0

68.2.   A much larger proportion of women are gainfully occupied in the old town than in the new township.   It has resulted in a relatively bigger labour force compared to that of the new township.   The labour force in old Faridabad includes 31.3 percent of the population as compared to only 26.6 percent of the population in the new township.

68.3.   Another striking feature is the much smaller proportion of the unemployed, that is, of those who were without work and were seeking employment on the date of survey.   Only 2.2 percent of the labour force was unemployed in this sense in old Faridabad as compared to 8.6 percent (50 out of 589 in our sample) in the new township.

69.1.   *Intensity of Employment* :   This lower proportion of the unemployed is only a partial picture and one has to study the intensity of employment of the entire labour force to get a more realistic view.   Adopting the method we have followed in our section on 'Nature and Intensity of Employment' we may make the following comparison between the intensity of employment in the old town and the new township. (The intensity of employment relates to the three months' period December 1953— February 1954 in the case of the new township and January—March 1954 in the case of old Faridabad).

TABLE 62 :   INTENSITY OF EMPLOYMENT OF LABOUR FORCE IN OLD FARIDABAD AND THE NEW TOWNSHIP

	old Faridabad		new township	
	percent of labour force	average income (Rs.)	percent of labour force	average income (Rs.)
(1)	(2)	(3)	(4)	(5)
fully employed	64	48	61	80
partially employed	18	33	20	39
scantily employed	11	13	7	13
practically unemployed	7	2	12	2
total	100	38	100	58

69.2. Thus we see that the fully employed and the partially employed are about the same number in the two towns. The scantily employed are one and half times as many in old Faridabad as in the new township, but the practically unemployed are less than two-thirds of their proportion in the new township. The two groups scantily employed and practically unemployed taken together represent almost the same proportion of the labour force in the two towns.

70. *Income* : There is however a large difference in the average income of the fully employed in the old Faridabad and the new township. The average income in the latter is Rs. 80 as against Rs. 48 in the former. The average income (Rs. 39 per month) of the partially employed is also significantly higher (by Rs. 6 per month) than of the same class in old Faridabad. The average incomes in the other two groups are identical.

71.1. *Expenditure Level* : If we classify 100 households each of the new township and the old town by their expenditure levels we will find the following:

TABLE 63 : EXPENDITURE LEVELS OF HOUSEHOLDS IN OLD FARIDABAD AND THE NEW TOWNSHIP.

expenditure level	old Faridabad	new township
(1)	(2)	(3)
upto Rs. 50	41	16
Rs. 51—100	30	43
Rs. 101—150	16	24
Rs. 151—200	10	10
Rs. 201 & above	3	7
total	100	100

71.2. The above figures clearly show that the level of expenditure of households in old Faridabad is much lower than in the new township. Old Faridabad has a much higher proportion of households with monthly expenditure not exceeding Rs. 50, and comparatively smaller proportion of households with expenditure lying between Rs. 51 and 100 and Rs. 101-150. 87 percent of all households have expenditures less than Rs. 150 in old Faridabad and a little less (83 percent) in the new township. The proportion in expenditure level Rs. 151-200 is the same (10 percent) in the two but the new township has more households (7 percent) with expenditure exceeding Rs. 200 than the old town (3 percent).

71.3 Per household consumer expenditure is only Rs. 80. 4 in old Faridabad as against Rs. 104.3 in the new township. Per capita consumer expenditure in new township is Rs. 23.5, one-third higher than in the old township (Rs. 17.3). The relative proportion of expenditure on food (64 percent) and on non-food items, 36 percent, however, remains the same. Cereals alone account for 30 percent of the total expenditure in old Faridabad, 4 percent more than in the new township. The average household in old Faridabad spends per capita Rs. 11.0 per month on food, Rs. 6.3 on non-food and the average household in new township spends Rs. 4.0 more for food and

Rs. 2.2 more for non-food items. The quantity of cereals consumed is about the same, but in old Faridabad this is composed of 7.5 seers of wheat and 6.7 seers of other inferior cereals; in the new township, of 11.7 seers of wheat and only 2.4 seers of inferior cereals.

72.1. *Housing* : An important element in the standard of living is the standard of housing accommodation. A comparison has been made in table 64 below in respect of housing in the two towns :

TABLE 64 : COMPARISON OF HOUSING IN OLD FARIDABAD AND THE NEW TOWNSHIP

particulars of houses	percent of all households in old Faridabad	percent of all households in new township
(1)	(2)	(3)
type of construction		
katcha	37.5	0.5
semi pucca	22.5	2.7
pucca	40.0	96.8
	100.0	100.0
number of rooms		
one	50.0	19.3
two	30.0	73.7
three or more	20.0	7.0
	100.0	100.0
occupancy status		
owned	54.2	4.3
rented	45.8	95.0
sublet	—	0.7
	100.0	100.0

72.2. Only two-fifths of all households in the old town have pucca houses while practically all live in newly built pucca houses in the township.

72.3. Half the households in old Faridabad have only one room accommodation and only three-fifths have two rooms. In the new township, on the other hand, less than one-fifth have only one room and nearly three-fourths of all households have two-roomed houses.

72.4. The difference in the occupancy status of households is what may be expected. The houses newly built by Government in Faridabad are practically all alloted on a rental basis. In the old town, however, it is reasonable to expect the majority of the local residents to have their own houses. In fact, the 'owned' class accounts for 54 percent of households which is incidentally also the percentage of all households who are local residents of the town. The migrant households alone number 40 percent and a very large majority of them might be expected to occupy a house only as a tenant.

SURVEY OF FARIDABAD TOWNSHIP

Conclusion

73.1. We may sum up our brief and broad comparison with the conclusion that the people of Faridabad township, poor as they are, are generally much better off than the people of the old town in respect of education, housing and income. They have generally a higher level of expenditure, eat better food and spend more on non-food items.

73.2. There are more dependents per earner in the new township than in the old and women who work are in smaller proportion.

73.3. The intensity of employment of the labour force is of the same order, and though the proportion of totally unemployed in the new township is higher, the practically unemployed and the scantily employed taken together are in the same proportion in the two towns.

73.4. One has to remember at the same time that to maintain even their present standard of living, the people of the new township must have much wider avenues of employment than now, partly to fill the gap between their present expenditure and income and partly to replace the relief and purely temporary type of work (arranged by the Government to relieve the immediate hardship) by stable sources of employment and these in Faridabad itself.

WORKERS ENGAGED IN THE SURVEY

Investigators

H. L. Jain

Jasmer Singh

P. S. Grewal

S. S. Hansra

R. L. Mehta

A. K. Kochar

S. S. Brar

N. C. Sood

T. R. Sharma

K. K. Mangi

H. N. Chug

P. L. Sharma

G. S. Dhanwal

G. S. Ahluwalia

S. L. Bharadwaj

S. N. Bhatt

Supervisory and inspection

S. C. Tripathi

B. B. Behl

R. N. Kapur

Processing and Tabulation of Data

Chakraverti, A. K.

Rao, Sethu Madhava

Sharma, P. S.

Sinha, P.

Ramasubramanian, N. R.

Vasudevan, M.

General Direction, Analysis and Report

Pitambar Pant

131

STATISTICAL TABLES

March—April 1954

TABLE 1.1 : PARTICULARS OF MIGRATION OF HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED

serial no.	particulars of migration		no. of households			percentages		
			regis-tered	not regis-tered	total	regis-tered	not regis-tered	total
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
1	migrated from North West Frontier Province	rural	199	6	205	44.8	10.7	41.0
2		urban	195	9	204	43.9	16.1	40.8
3		total	394	15	409	88.7	26.8	81.8
4	migrated from other Provinces of Pakistan	rural	31	6	37	7.0	10.7	7.4
5		urban	18	14	32	4.1	25.0	6.4
6		total	49	20	69	11.1	35.7	13.8
7	all migrated	rural	230	12	242	51.8	21.4	48.4
8		urban	213	23	236	48.0	41.1	47.2
9		total	443	35	478	99.8	62.5	95.6
10	posted on transfer		—	7	7	—	12.5	1.4
11	non-local persons now settled in Faridabad		1	5	6	0.2	8.9	1.2
12	local— not-migrated		—	2	2	—	3.6	0.4
13	temporary visitors on economic business		—	7	7	—	12.5	1.4
14	temporary visitors on non-economic affairs		—	—	—	—	—	—
15	total not-migrated		1	21	22	0.2	37.5	4.4
16	all households		444	56	500	100.0	100.0	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 1.2 : PARTICULARS OF MIGRATION OF REGISTERED AND NOT-REGISTERED PERSONS

serial no.	particulars of migration		no. of persons			percentage		
			regis-tered	not regis-tered	total	regis-tered	not regis-tered	total
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
1	migrated from North-West Frontier Province	rural	724	22	746	38.2	6.8	33.6
2		urban	742	54	796	39.1	16.8	35.9
3		total	1466	76	1542	77.3	23.6	69.5
4	migrated from other provinces of Pakistan	rural	96	15	111	5.1	4.7	5.0
5		urban	62	57	119	3.3	17.7	5.4
6		total	158	72	230	8.4	22.4	10.4
7	all migrated	rural	820	37	857	43.3	11.5	38.6
8		urban	804	111	915	42.4	34.5	41.3
9		total	1624	148	1772	85.7	46.0	79.9
10	posted on transfer		—	11	11	—	3.4	0.5
11	non-local persons now settled in Faridabad		264	130	394	13.9	40.4	17.8
12	local— not-migrated		8	9	17	0.4	2.8	0.8
13	temporary visitors on econo-mic business		—	14	14	—	4.3	0.6
14	temporary visitors on non-economic affairs		—	10	10	—	3.1	0.4
15	all not-migrated		272	174	446	14.3	54.0	20.1
16	all persons		1896	322	2218	100.0	100.0	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 1.3 : NUMBER OF PERSONS, REGISTERED AND NOT-REGISTERED, BY DISTRICTS AND AREAS (RURAL OR URBAN) FROM WHICH MIGRATED

srl. no.	state/district from which migrated	registered			not-registered			total rural	total urban	all
		rural	urban	total	rural	urban	total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

number of persons

srl. no.	state/district	rural	urban	total	rural	urban	total	total rural	total urban	all
1	Bannu	303	477	780	5	25	30	308	502	810
2	Dera Ismail Khan	170	61	231	7	5	12	177	66	243
3	Hazara	37	22	59	2	9	11	39	31	70
4	Kohat	128	62	190	3	9	12	131	71	202
5	Mardan	51	56	107	1	2	3	52	58	110
6	Peshwar	35	64	99	4	4	8	39	68	107
7	total : N.W.F.P.	724	742	1466	22	54	76	746	796	1542
8	Dera Ghazi Khan	95	31	126	10	4	14	105	35	140
9	Lahore	–	4	4	–	11	11	–	15	15
10	Lyallpur	–	–	–	1	1	2	1	1	2
11	Montgomery	–	–	–	–	4	4	–	4	4
12	Multan	1	–	1	4	5	9	5	5	10
13	Rawalpindi	–	7	7	–	1	1	–	8	8
14	Sargodha	–	8	8	–	4	4	–	12	12
15	Sheikhpura	–	7	7	–	–	–	–	7	7
16	total : Punjab	96	57	153	15	30	45	111	87	198
17	other states of Pakistan	–	5	5	–	27	27	–	32	32
18	all migrated	820	804	1624	37	111	148	857	915	1772

percentages of total migrated

srl. no.	state/district	rural	urban	total	rural	urban	total	total rural	total urban	all
19	Bannu	17.1	26.9	44.0	0.3	1.4	1.7	17.4	28.3	45.7
20	Dera Ismail Khan	9.6	3.4	13.0	0.4	0.3	0.7	10.0	3.7	13.7
21	Hazara	2.1	1.3	3.4	0.1	0.5	0.6	2.2	1.8	4.0
22	Kohat	7.2	3.5	10.7	0.2	0.5	0.7	7.4	4.0	11.4
23	Mardan	2.9	3.2	6.1	–	0.1	0.1	2.9	3.3	6.2
24	Peshawar	2.0	3.6	5.6	0.2	0.2	0.4	2.2	3.8	6.0
25	total : N.W.F.P.	40.9	41.9	82.8	1.2	3.0	4.2	42.1	44.9	87.0
26	Dera Ghazi Khan	5.3	1.8	7.1	0.6	0.2	0.8	5.9	2.0	7.9
27	Lahore	–	0.2	0.2	–	0.6	0.6	–	0.8	0.8
28	Lyallpur	–	–	–	0.1	–	0.1	0.1	–	0.1
29	Montgomeri	–	–	–	–	0.2	0.2	–	0.2	0.2
30	Multan	0.1	–	0.1	0.2	0.3	0.5	0.3	0.3	0.6
31	Rawalpindi	–	0.4	0.4	–	0.1	0.1	–	0.5	0.5
32	Sargodha	–	0.4	0.4	–	0.3	0.3	–	0.7	0.7
33	Sheikhpura	–	0.4	0.4	–	–	–	–	0.4	0.4
34	total : Punjab	5.4	3.2	8.6	0.9	1.7	2.6	6.3	4.9	11.2
35	other states of Pakistan	–	0.2	0.2	–	1.6	1.6	–	1.8	1.8
36	all migrated	46.3	45.3	91.6	2.1	6.3	8.4	48.4	51.6	100.0

18

TABLE 1.4 : PERIOD OF ARRIVAL IN FARIDABAD OF HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED

sl. no.	actual period of arrival	length of stay (months)	households with heads		all h.h.	cumu- lative totals	percentages			
			regis- tered	not regis- tered			regis- tered	not regis- tered	all h.h.	cum. total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	March, 1948 — Aug., 1948	72—67	27	1	28	28	6.1	1.8	5.6	5.6
2	Sept., 1948 — Feb., 1949	66—61	57	–	57	85	12.8	—	11.4	17.0
3	March, 1949 — Aug., 1949	60—55	144	9	153	238	32.4	16.1	30.6	47.6
4	Sept., 1949 — Feb., 1950	54—49	83	3	86	324	18.7	5.4	17.2	64.8
5	March, 1950 — Aug., 1950	48—43	78	8	86	410	17.6	14.3	17.2	82.0
6	Sept., 1950 — Feb., 1951	42—37	29	4	33	443	6.5	7.1	6.6	88.6
7	March, 1951 — Aug., 1951	36—31	15	10	25	468	3.4	17.9	5.0	93.6
8	Sept., 1951 — Feb., 1952	30—25	6	4	10	478	1.3	7.1	2.0	95.6
9	March, 1952 — Aug., 1952	24—19	1	5	6	484	0.2	8.9	1.2	96.8
10	Sept., 1952 — Feb., 1953	18—13	–	1	1	485	—	1.8	0.2	97.0
11	March, 1953 — Aug., 1953	12— 7	2	5	7	492	0.5	8.9	1.4	98.4
12	Sept., 1953 — Feb., 1954	6— 0	2	6	8	500	0.5	10.7	1.6	100.0
13	all periods		444	56	500	—	100.0	100.0	100.0	

TABLE 1.5 : PERIOD OF ARRIVAL IN FARIDABAD OF PERSONS IN HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED

sl. no.	actual period of arrival	length of stay (months)	persons in households		all per- sons	cum. total	percentages			
			regis- tered	not regis- tered			regis- tered	not regis- tered	all per- sons	cum. total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	March, 1948 — Aug., 1948	72—67	105	2	107	107	5.2	1.0	4.8	4.8
2	Sept., 1948 — Feb., 1949	66—61	211	—	211	318	10.5	—	9.5	14.3
3	March, 1949 — Aug., 1949	60—55	533	24	557	875	26.5	11.7	25.1	39.4
4	Sept., 1949 — Feb., 1950	54—49	354	26	380	1255	17.6	12.6	17.1	56.5
5	March, 1950 — Aug., 1950	48—43	321	19	340	1595	16.0	9.2	15.3	71.8
6	Sept., 1950 — Feb., 1951	42—37	149	14	163	1758	7.4	6.8	7.4	79.2
7	March, 1951 — Aug., 1951	36—31	100	29	129	1887	5.0	14.0	5.8	85.0
8	Sept., 1951 — Feb., 1952	30—25	61	8	69	1956	3.0	3.9	3.1	88.1
9	March, 1952 — Aug., 1952	24—19	49	23	72	2028	2.4	11.2	3.3	91.4
10	Sept., 1952 — Feb., 1953	18—13	43	9	52	2080	2.1	4.4	2.4	93.8
11	March, 1953 — Aug., 1953	12— 7	40	20	60	2140	2.0	9.7	2.7	96.5
12	Sept., 1953 — Feb., 1954	6— 0	46	32	78	2218	2.3	15.5	3.5	100.0
13	all periods		2012	206	2218	–	100.0	100.0	100.0	

number of households surveyed : 500   total no. of households : 5374

TABLE 2.1 : NUMBER OF HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED BY SIZE OF HOUSEHOLDS

srl. no.	size of house- hold	households with heads registered				households with heads unregistered				all households			
		number of		percentage		number of		percentage		number of		percentage	
		house- holds	per- sons	house- hold	per- sons	house- holds	per- sons	house- hold	per- sons	house- holds	per- sons	house- hold	per- sons
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	1	34	34	7.6	1.7	13	13	23.2	6.4	47	47	9.4	2.1
2	2	47	94	10.6	4.7	6	12	10.7	5.9	53	106	10.6	4.8
3	3	74	222	16.7	11.0	12	36	21.4	17.6	86	258	17.2	11.6
4	4	84	336	18.9	16.3	10	40	17.8	19.6	94	376	18.8	17.0
5	5	72	360	16.0	17.6	5	25	10.7	14.7	77	385	15.4	17.3
6	6	50	300	11.5	15.2	6	36	9.0	14.7	56	336	11.2	15.2
7	7	43	301	9.7	15.0	—	—	—	—	43	301	8.6	13.6
8	8	19	152	4.3	7.5	1	8	1.8	3.9	20	160	4.0	7.3
9	9	9	81	1.8	4.0	—	—	—	—	9	81	1.8	3.6
10	10	6	60	1.6	3.5	1	10	1.8	4.4	7	70	1.4	3.1
11	11	3	33	0.7	1.6	—	—	—	—	3	33	0.6	1.5
12	12	2	24	0.4	1.2	1	12	1.8	5.9	3	36	0.6	1.6
13	13	—	—	—	—	—	—	—	—	—	—	—	—
14	14	—	—	—	—	1	14	1.8	6.9	1	14	0.2	0.6
15	15	1	15	0.2	0.7	—	—	—	—	1	15	0.2	0.7
16	all	444	2012	100.0	100.0	56	206	100.0	100.0	500	2218	100.0	100.0
17	average h.h. size	4.53				3.68				4.44			

no. of households surveyed : 500   total no. of households : 5374

TABLE 2.2:   DISTRIBUTION OF AGE LAST BIRTHDAY BY SEX OF PERSONS IN HOUSEHOLDS WITH HEADS REGISTERED AND UNREGISTERED

sl. no.	age last birthday	number of persons in households having									percentages								
		h.h. heads regtd.			h.h. heads unregtd.			all households			h.h. heads regtd.			h.h. heads unregtd.			all households		
		male	female	total	male	female	total	male	female	total	male	female	total	male	female	total	male	female	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1	0	28	20	48	4	2	6	32	22	54	1.4	1.0	2.4	1.9	1.0	2.9	1.4	1.0	2.4
2	1— 4	108	104	212	11	14	25	119	118	237	5.4	5.1	10.5	5.3	6.8	12.1	5.4	5.3	10.7
3	5— 9	135	137	272	10	10	20	145	147	292	6.7	6.8	13.5	4.9	4.9	9.8	6.5	6.6	13.1
4	10—14	154	175	329	17	8	25	171	183	354	7.7	8.7	16.4	8.3	3.9	12.2	7.7	8.3	16.0
5	15—19	117	128	245	7	11	18	124	139	263	5.8	6.4	12.2	3.4	5.3	8.7	5.6	6.3	11.9
6	20—24	101	87	188	14	15	29	115	102	217	5.0	4.3	9.3	6.8	7.3	14.1	5.2	4.6	9.8
7	25—29	78	65	143	15	7	22	93	72	165	3.9	3.2	7.1	7.3	3.4	10.7	4.2	3.2	7.4
8	30—34	42	41	83	6	7	13	48	48	96	2.1	2.0	4.1	2.9	3.4	6.3	2.2	2.1	4.3
9	35—39	37	41	78	9	4	13	46	45	91	1.8	2.1	3.9	4.4	1.9	6.3	2.1	2.0	4.1
10	40—44	33	44	77	8	3	11	41	47	88	1.7	2.1	3.8	3.9	1.4	5.3	1.9	2.1	4.0
11	45—49	39	51	90	3	3	6	42	54	96	1.9	2.6	4.5	1.5	1.4	2.9	1.9	2.4	4.3
12	50—54	35	36	71	3	2	5	38	38	76	1.7	1.8	3.5	1.4	1.0	2.4	1.7	1.7	3.4
13	55—59	16	22	38	4	1	5	20	23	43	0.8	1.1	1.9	1.9	0.5	2.4	0.9	1.1	2.0
14	60—69	41	59	100	2	4	6	43	63	106	2.0	3.0	5.0	1.0	1.9	2.9	1.9	2.9	4.8
15	70—79	12	17	29	—	1	1	12	18	30	0.6	0.8	1.4	—	0.5	0.5	0.5	0.9	1.4
16	80—89	1	8	9	—	1	1	1	9	10	0.1	0.4	0.5	—	0.5	0.5	0.0	0.4	0.4
17	all ages	977	1035	2012	113	93	206	1090	1128	2218	48.6	51.4	100.0	54.9	45.1	100.0	49.1	50.9	100.0

no. of households surveyed : 500

total no. of households : 5374

TABLE 2.3 : MARITAL STATUS BY AGE AND SEX OF PERSONS IN HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED

			number of persons in households having												percentages within age groups for all households					percentages between age groups for all households			
			heads registered				heads unregistd.			all households													
sl. no.	age last birthday	sex	single	marr-ied	wido-wed	sepa-rated	sin-gle	marr-ied	wido-wed	sin-gle	marr-ied	wido-wed	sepa-rated	total	sin-gle	marr-ied	wido-wed	sepa-rated	total	sin-gle	marr-ied	wido-wed	sepa-rated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
1	0–14	male	425	—	—	—	42	—	—	467	—	—	—	467	100.0	—	—	—	100.0	39.6	—	—	—
		female	432	4	—	—	33	1	—	465	5	—	—	470	98.9	1.1	—	—	100.0	39.5	0.6	—	—
2	15–19	male	110	7	—	—	6	1	—	116	8	—	—	124	93.5	6.5	—	—	100.0	9.9	1.0	—	—
		female	59	68	1	—	5	6	—	64	74	1	—	139	46.1	53.2	0.7	—	100.0	5.4	8.9	0.5	—
3	20–24	male	40	59	2	—	4	10	—	44	69	2	—	115	38.3	60.0	1.7	—	100.0	3.7	8.3	1.0	—
		female	4	78	3	2	1	14	—	5	92	3	2	102	4.9	90.2	2.9	2.0	100.0	0.4	11.1	1.4	66.7
4	25–29	male	8	64	6	—	1	14	—	9	78	6	—	93	9.7	83.8	6.5	—	100.0	0.8	9.4	2.9	—
		female	—	63	1	1	—	7	—	—	70	1	1	72	—	97.2	1.4	1.4	100.0	—	8.5	0.5	33.3
5	30–39	male	3	67	9	—	1	13	1	4	80	10	—	94	4.3	85.1	10.6	—	100.0	0.3	9.7	4.8	—
		female	—	67	15	—	—	11	—	—	78	15	—	93	—	83.9	16.1	—	100.0	—	9.4	7.1	—
6	40–49	male	1	64	7	—	1	10	—	2	74	7	—	83	2.4	89.2	8.4	—	100.0	0.2	8.9	3.3	—
		female	—	59	36	—	—	6	—	—	65	36	—	101	—	64.4	35.6	—	100.0	—	7.9	17.1	—
7	50–59	male	—	44	7	—	2	4	1	2	48	8	—	58	3.4	82.8	13.8	—	100.0	0.2	5.8	3.8	—
		female	—	32	26	—	—	—	3	—	32	29	—	61	—	52.5	47.5	—	100.0	—	3.9	13.8	—
8	60–69	male	—	34	7	—	—	2	—	—	36	7	—	43	—	83.7	16.3	—	100.0	—	4.4	3.3	—
		female	—	8	51	—	—	1	3	—	9	54	—	63	—	14.3	85.7	—	100.0	—	1.1	25.7	—
9	70–79	male	—	8	4	—	—	—	—	—	8	4	—	12	—	66.7	33.3	—	100.0	—	1.0	1.9	—
		female	—	—	17	—	—	—	1	—	—	18	—	18	—	—	100.0	—	100.0	—	—	8.6	—
10	80–89	male	—	1	—	—	—	—	—	—	1	—	—	1	—	100.0	—	—	100.0	—	0.1	—	—
		female	—	—	8	—	—	—	1	—	—	9	—	9	—	—	100.0	—	100.0	—	—	4.3	—
11	all ages	male	587	348	42	—	57	54	2	644	402	44	—	1090	59.1	36.9	4.0	—	100.0	54.7	48.6	21.0	—
		female	495	379	158	3	39	46	8	534	425	166	3	1128	47.3	37.7	14.7	0.3	100.0	45.3	51.4	79.0	100.0
	total		1082	727	200	3	96	100	10	1178	827	210	3	2218	53.1	37.3	9.5	0.1	100.0	100.0	100.0	100.0	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 2.4 : EDUCATION STANDARD OF PERSONS IN HOUSEHOLDS WITH HEADS REGISTERED AND UNREGISTERED BY AGE & SEX

sl. no.	age last birthday	sex	number of persons of different education standard* in																	
			households with heads registered						households with heads unregistered						all households					
			1	2	3	4	5	total	1	2	3	4	5	total	1	2	3	4	5	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1	0— 4	male	136	—	—	—	—	136	15	—	—	—	—	15	151	—	—	—	—	151
2		female	120	4	—	—	—	124	16	—	—	—	—	16	136	4	—	—	—	140
3	5— 9	male	47	88	—	—	—	135	2	8	—	—	—	10	49	96	—	—	—	145
4		female	63	74	—	—	—	137	5	5	—	—	—	10	68	79	—	—	—	147
5	10—14	male	6	138	10	—	—	154	1	16	1	—	—	17	6	154	11	—	—	171
6		female	34	137	4	—	—	175	1	6	1	—	—	8	35	143	5	—	—	183
7	15—19	male	8	65	33	11	—	117	—	4	3	—	—	7	8	69	36	11	—	124
8		female	53	65	10	—	—	128	1	6	4	—	—	11	54	71	14	—	—	139
9	20—24	male	6	53	23	19	—	101	2	7	1	3	1	14	8	60	24	22	1	115
10		female	48	37	—	2	—	87	7	6	2	—	—	15	55	43	2	2	—	102
11	25—29	male	9	47	15	7	—	78	1	8	2	4	—	15	10	55	17	11	—	93
12		female	34	28	3	—	—	65	3	3	1	—	—	7	37	31	4	—	—	72
13	30—39	male	10	49	16	4	—	79	2	4	2	6	1	15	12	53	18	10	1	94
14		female	56	22	4	—	—	82	1	8	—	1	1	11	57	30	4	1	1	93
15	40—49	male	13	48	9	2	—	72	2	3	—	6	—	11	15	51	9	8	—	83
16		female	76	17	2	—	—	95	—	5	1	—	—	6	76	22	3	—	—	101
17	50—59	male	8	34	7	2	1	51	1	1	1	3	1	7	9	35	8	5	1	58
18		female	51	7	—	—	—	58	2	1	—	—	—	3	53	8	—	—	—	61
19	60—	male	14	34	5	—	1	54	1	1	—	—	—	2	15	35	5	—	1	56
20		female	80	3	1	—	—	84	6	—	—	—	—	6	86	3	1	—	—	90
21	all ages	male	257	556	118	45	1	977	26	52	10	22	3	113	283	608	128	67	4	1090
22		female	615	394	24	2	—	1035	42	40	9	1	1	93	657	434	33	3	1	1128
23		total	872	950	142	47	1	2012	68	92	19	23	4	206	940	1042	161	70	5	2218

*education standard : 1-illiterate, 2-literate but not middle, 3-middle but not matric, 4-matric (or higher secondary) and intermediate, 5-graduate and post-graduate

no. of households surveyed : 500   total no. of households : 5374

TABLE 3.1: PRINCIPAL OCCUPATION OF MIGRANT HOUSEHOLDS IN INDIA AND IN PAKISTAN

serial number (1)	principal occupation of migrant households in Pakistan (2)	principal occupations of migrant households in India																all occupations (19)	percentages (20)
		retail & wholesale traders (3)	contractors, brokers, etc. (4)	artisans (5)	administrative, executive, clerical (6)	medical, health (7)	education (8)	transport and communication (9)	industrial workers (10)	labourers (11)	domestic servants (12)	sweepers (13)	cultivators (14)	other occupations (15)	rentiers, pensioners (16)	living on doles (17)	unemployed (18)		
1	retail & wholesale traders	28	5	32	23	2	3	7	32	64	—	—	1	3	—	32	8	240	50.2
2	contractors, brokers etc.	—	—	2	2	—	1	—	1	6	—	—	—	1	—	4	—	17	3.6
3	artisans	—	—	11	5	—	1	1	6	8	2	—	—	—	—	3	2	39	8.2
4	administrative, executive, clerical	2	—	—	8	—	2	—	4	3	—	—	—	1	—	1	5	26	5.4
5	medical and health	—	—	—	—	3	—	—	1	1	—	—	—	—	—	2	—	7	1.5
6	education	—	—	—	2	1	3	—	—	—	—	—	—	—	—	—	—	6	1.3
7	transport & communication	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	industrial workers	—	—	1	6	—	—	1	8	1	—	—	—	—	—	3	—	20	4.2
9	labourers	—	—	—	—	—	—	—	1	3	—	—	—	—	—	1	—	5	1.0
10	domestic servants	—	—	1	—	—	—	—	—	—	—	—	—	—	—	3	—	4	0.8
11	sweepers	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	5	1.0
12	cultivators	1	—	1	—	—	1	1	1	5	—	—	—	1	—	2	3	16	3.3
13	other occupations	3	—	—	2	—	1	2	4	3	—	—	—	2	—	2	1	20	4.2
14	rentiers, pensioners	3	2	4	7	—	2	—	5	13	—	—	—	1	—	12	4	53	11.1
15	living on doles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	unemployed	1	—	—	3	—	—	1	2	1	1	—	—	—	—	8	3	20	4.2
17	all occupations	38	7	52	58	6	14	13	65	108	3	5	1	9	—	73	26	478	100.0
18	percentages	8.0	1.5	10.9	12.1	1.3	2.9	2.7	13.6	22.6	0.6	1.0	0.2	1.9	—	15.3	5.4	100.0	

no. of households surveyed : 500   total no. of households : 5374

TABLE 3.2:   PRINCIAPL OCCUPATION OF MIGRANT HOUSEHOLDS IN INDIA AND IN PAKISTAN— PERCENTAGE DISTRIBUTION BY PRINCIPAL OCCUPATION IN PAKISTAN

serial number	principal occupation of migrant households in Pakistan	principal occupations of migrant households in India																
(1)	(2)	retail & wholesale traders (3)	contractors, brokers, etc. (4)	artisans (5)	administrative, executive, clerical (6)	medical, health (7)	education (8)	transport and communication (9)	industrial workers (10)	labourers (11)	domestic servants (12)	sweepers (13)	cultivators (14)	other occupations (15)	rentiers, pensioners (16)	living on doles (17)	unemployed (18)	all occupations (19)
1	retail & wholesale traders	11.7	2.1	13.3	9.6	0.8	1.3	2.9	13.3	26.7	—	—	0.4	1.3	—	13.3	3.3	100.0
2	contractors, brokers etc.	—	—	11.8	11.8	—	5.9	—	5.9	35.2	—	—	—	5.9	—	23.5	—	100.0
3	artisans	—	—	28.2	12.8	—	2.6	2.6	15.4	20.5	5.1	—	—	—	—	7.7	5.1	100.0
4	administrative executive. clerical	7.7	—	—	30.8	—	7.7	—	15.4	11.5	—	—	—	3.8	—	3.8	19.3	100.0
5	medical and health	—	—	—	—	42.8	—	—	14.3	14.3	—	—	—	—	—	28.6	—	100.0
6	education	—	—	—	33.3	16.7	50.0	—	—	—	—	—	—	—	—	—	—	100.0
7	transport & communication	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	industrial workers	—	—	5.0	30.0	—	—	5.0	40.0	5.0	—	—	—	—	—	15.0	—	100.0
9	labourers	—	—	—	—	—	—	—	20.0	60.0	—	—	—	—	—	20.0	—	100.0
10	domestic servants	—	—	25.0	—	—	—	—	—	—	—	—	—	—	—	75.0	—	100.0
11	sweepers	—	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	100.0
12	cultivators	6.3	—	6.3	—	—	6.2	6.2	6.2	31.3	—	—	—	6.2	—	12.5	18.8	100.0
13	other occupations	15.0	—	—	10.0	—	5.0	10.0	20.0	15.0	—	—	—	10.0	—	10.0	5.0	100.0
14	rentiers, pensioners	5.7	3.8	7.5	13.2	—	3.8	—	9.4	24.5	—	—	—	1.9	—	22.6	7.6	100.0
15	living on doles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	unemployed	5.0	—	—	15.0	—	—	5.0	10.0	5.0	5.0	—	—	—	—	40.0	15.0	100.0
17	all occupations	8.0	1.5	10.9	12.1	1.3	2.9	2.7	13.6	22.6	0.6	1.0	0.2	1.9	—	15.3	5.4	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 3.3: PRINCIPAL OCCUPATION OF MIGRANT HOUSEHOLDS IN INDIA AND IN PAKISTAN— PERCENTAGE DISTRIBUTION BY PRINCIPAL OCCUPATION IN INDIA

serial number	principal occupation of migrant households in Pakistan	principal occupations of migrant households in India																
		retail & wholesale traders	contractors, brokers, etc.	artisans	administrative, executive, clerical	medical, and health	education	transport and communication	industrial workers	labourers	domestic servants	sweepers	cultivators	other occupations	rentiers, pensioners	living on doles	unemployed	all occupations
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1	retail & wholesale traders	73.7	71.4	61.6	39.7	33.3	21.5	53.8	49.3	59.3	—	—	—	33.4	—	43.9	30.8	50.2
2	contractors, brokers etc.	—	—	3.8	3.4	—	7.1	—	1.5	5.6	—	—	100.0	11.1	—	5.5	—	3.6
3	artisans	—	—	21.2	8.6	—	7.1	7.7	9.2	7.4	66.7	—	—	—	—	4.1	7.7	8.2
4	administrative, executive, clerical	5.3	—	—	13.8	—	14.3	—	6.2	2.8	—	—	—	11.1	—	1.4	19.3	5.4
5	medical and health	—	—	—	—	50.0	—	—	1.5	0.9	—	—	—	—	—	2.7	—	1.5
6	education	—	—	—	3.4	16.7	21.5	—	—	—	—	—	—	—	—	—	—	1.3
7	transport & communication	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	industrial workers	—	—	1.9	10.4	—	—	7.7	12.3	0.9	—	—	—	—	—	4.1	—	4.2
9	labourers	—	—	—	—	—	—	—	1.5	2.8	—	—	—	—	—	1.4	—	1.0
10	domestic servants	—	—	1.9	—	—	—	—	—	—	—	—	—	—	—	4.1	—	0.8
11	sweepers	2.6	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	1.0
12	cultivators	7.9	—	1.9	—	—	7.1	7.7	1.5	4.6	—	—	—	11.1	—	2.7	11.5	3.3
13	other occupations	7.9	—	—	3.4	—	7.1	15.4	6.2	2.8	—	—	—	22.2	—	2.7	3.8	4.2
14	rentiers, pensioners	7.9	28.6	7.7	12.1	—	14.3	—	7.7	12.0	—	—	—	11.1	—	16.4	15.4	11.1
15	living on doles	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	unemployed	2.6	—	—	5.2	—	—	7.7	3.1	0.9	33.3	—	—	—	—	11.0	11.5	4.2
17	all occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	—	100.0	100.0	100.0

no. of households surveyed : 500 · total no. of households : 5374

145

TABLE 4.1 : EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS BY AGE AND SEX

sl. no.	age last birthday	earners					earning dependents				non-earning dependents			all combined					
		working	seeking employment	cash doles	remittances	total	working	cash doles	remittances	total	seeking employment	other dependents	total	working	seeking employment	cash doles	remittances	other dependents	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
										males									
1	0—14	1	—	1	—	2	2	1	—	3	—	462	462	3	—	2	—	462	467
2	15—17	8	—	—	—	8	5	—	—	5	4	47	51	13	4	—	—	47	64
3	18—19	29	2	—	—	31	8	—	—	8	5	16	21	37	7	1	—	16	60
4	20—24	101	2	1	—	104	3	—	—	3	8	—	8	104	10	1	—	—	115
5	25—39	170	7	2	—	179	1	—	—	1	7	—	7	171	14	2	—	—	187
6	40—59	112	6	6	—	124	3	—	2	5	4	8	12	115	10	6	2	8	141
7	60—69	23	1	3	3	30	3	—	—	3	1	9	10	26	2	3	3	9	43
8	70—89	3	—	2	2	7	1	—	—	1	—	5	5	4	—	2	2	5	13
9	all ages	447	18	15	5	485	26	1	2	29	29	547	576	473	47	16	7	547	1090
										females									
10	0—14	—	—	—	—	—	4	—	—	4	—	466	466	4	—	—	—	466	470
11	15—17	—	—	2	—	2	1	—	—	1	—	85	85	1	—	2	—	85	88
12	18—19	2	—	—	—	2	2	—	—	2	—	47	47	4	—	—	—	47	51
13	20—24	4	—	2	1	7	4	—	1	5	1	89	90	8	1	2	2	89	102
14	25—39	7	—	14	5	26	15	—	—	15	1	123	124	22	1	14	5	123	165
15	40—59	6	—	36	1	43	16	—	—	16	1	102	103	22	1	36	1	102	162
16	60—69	1	—	12	1	14	3	—	—	3	—	46	46	4	—	12	1	46	63
17	70—89	—	—	7	—	7	1	—	—	1	—	19	19	1	—	7	—	19	27
18	all ages	20	—	73	8	101	46	—	1	47	3	977	980	66	3	73	9	977	1128
										all persons									
19	0—14	1	—	1	—	2	6	1	—	7	—	928	928	7	—	2	—	928	937
20	15—17	8	—	2	—	10	6	—	—	6	4	132	136	14	4	2	—	132	152
21	18—19	31	2	—	—	33	10	—	—	10	5	63	68	41	7	—	—	63	111
22	20—24	105	2	3	1	111	7	—	1	8	9	89	98	112	11	3	2	89	217
23	25—39	177	7	16	5	205	16	—	—	16	8	123	131	193	15	16	5	123	352
24	40—59	118	6	42	4	167	19	—	2	21	5	110	115	137	11	42	3	110	303
25	60—69	24	1	15	4	44	6	—	—	6	1	55	56	30	2	15	4	55	106
26	70—89	3	—	9	2	14	2	—	—	2	—	24	24	5	—	9	2	24	40
27	all ages	467	18	88	13	586	72	1	3	76	32	1524	1556	539	50	89	16	1524	2218

number of households surveyed : 500   total no. of households : 5374

146

TABLE 4.2: PERCENTAGE OF EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS BY SEX, AGE AND TYPE OF EARNING

serial no.	age group	earners					earning dependents				non-earning dependents			earners, earning dependents and non-earning dependents							all	number of persons in the group in the sample	percent of total
				unearned income										in labour force			not in labour force — unearned income						
		working	only earner seeking empl.	getting cash doles	living on remittances	total	working	getting cash dole	receiving remittances	total	seeking employment	others—not in labour force	total	working	seeking employment	total	getting cash dole	living on remittances	dependents not in labour force	total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
													males										
1	0-14	0.2		0.2	—	0.4	0.4	0.2	—	0.6	—	99.0	99.0	0.6	—	0.6	0.4	—	99.0	99.4	100.0	467	42.8
2	15-19	29.8	1.6	—	—	31.4	10.5	—	—	10.5	7.3	50.8	58.1	40.3	8.9	49.2	—	—	50.8	50.8	100.0	124	11.4
3	20-24	87.8	1.7	0.9	—	90.4	2.6	—	—	2.6	7.0	—	7.0	90.4	8.7	99.1	0.9	—	—	0.9	100.0	115	10.6
4	25-39	91.0	3.6	1.1	—	95.7	0.5	—	—	0.5	3.8	—	3.8	91.5	7.4	98.9	1.1	—	—	1.1	100.0	187	17.2
5	40-59	79.5	4.2	4.3	—	88.0	2.1	—	1.4	3.5	2.8	5.7	8.5	81.6	7.0	88.6	4.3	1.4	5.7	11.4	100.0	141	12.9
6	60-69	53.5	2.3	7.0	7.0	69.8	7.0	—	—	7.0	2.3	20.9	23.2	60.5	4.6	65.1	7.0	7.0	20.9	34.9	100.0	43	3.9
7	70-89	23.1	—	15.4	15.4	53.9	7.7	—	—	7.7	—	38.4	38.4	30.8	—	30.8	15.4	15.4	38.4	69.2	100.0	13	1.2
8	all ages	41.0	1.7	1.4	0.5	44.6	2.4	0.1	0.2	2.7	2.7	50.2	52.9	43.4	4.4	47.8	1.5	0.6	50.2	52.3	100.0	1090	100.0
													females										
9	0-14	1.4	—	—	—	—	0.8	—	—	0.8	—	99.2	99.2	0.8	—	0.8	—	—	99.2	99.2	100.0	470	41.7
10	15-19	3.9	—	1.4	—	2.8	2.2	—	—	2.2	—	95.0	95.0	3.6	—	3.6	1.4	—	95.0	96.4	100.0	139	12.3
11	20-24	2.4	—	1.9	1.0	6.8	3.9	—	1.0	4.9	1.0	87.3	88.3	7.8	1.0	8.8	1.9	2.0	87.3	91.2	100.0	102	9.0
12	25-39		—	8.5	3.0	15.7	9.1	—	—	9.1	0.6	74.6	75.2	13.3	0.6	13.9	8.5	3.0	74.6	86.1	100.0	165	14.6
13	40-59	3.7	—	22.2	0.6	26.5	9.9	—	—	9.9	0.6	63.0	63.0	13.6	0.6	14.2	22.2	0.6	63.0	85.8	100.0	162	14.4
14	60-69	1.6	—	19.0	1.6	22.2	4.8	—	—	4.8	—	73.0	73.0	6.4	—	6.4	19.0	1.6	73.0	93.6	100.0	63	5.6
15	70-89	—	—	25.9	—	25.9	3.7	—	—	3.7	—	70.4	70.4	3.7	—	3.7	25.9	—	70.4	96.3	100.0	27	2.4
16	all ages	1.8	—	6.4	0.7	8.9	4.1	—	0.1	4.2	0.3	86.6	86.9	5.9	0.3	6.2	6.4	0.8	86.6	93.8	100.0	1128	100.0
17	both sexes	21.1	0.8	4.0	0.6	26.5	3.3	0.0	0.1	3.4	1.4	68.7	70.1	24.3	2.3	26.6	4.0	0.7	68.7	73.4	100.0	2218	100.0

no. of households surveyed : 500   no. of total households : 5374

147

TABLE 4.3 : EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS IN HOUSEHOLDS WITH REGISTERED AND NOT-REGISTERED HEADS

serial no.	details of earners, earning dependents and non-earning dependents	number of persons in								
		registered households			not-registered households			all households		
		male	female	total	male	female	total	male	female	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	earners									
1.1	in labour force									
1.1.1	working	385	17	402	62	3	65	447	20	467
1.1.2	earner seeking employment	18	–	18	–	–	–	18	–	18
1.2	not in labour force									
1.2.1	getting cash doles	15	73	88	–	–	–	15	73	88
1.2.2	receiving remittances	5	6	11	–	2	2	5	8	13
1.3	total : earners	423	96	519	62	5	67	485	101	586
2	earning dependents									
2.1	in labour force									
2.1.1	working	24	44	68	2	2	4	26	46	72
2.2	not in labour force									
2.2.1	getting cash doles	1	–	1	–	–	–	1	–	1
2.2.2	receiving remittances	2	1	3	–	–	–	2	1	3
2.3	total : earning dependents	27	45	72	2	2	4	29	47	76
3	non-earning dependents									
3.1	in labour force									
3.1.1	seeking employment	27	3	30	2	–	2	29	3	32
3.2	not in labour force									
3.2.1	other dependents	500	891	1391	47	86	133	547	977	1524
3.3	total : non-earning dependents	527	894	1421	49	86	135	576	980	1556
4	all persons									
4.1	in labour force									
4.1.1	working	409	61	470	64	5	69	473	66	539
4.1.2	seeking employment	45	3	48	2	–	2	47	3	50
4.2	total : in labour force	454	64	518	66	5	71	520	69	589
4.3	not in labour force									
4.3.1	cash doles	16	73	89	–	–	–	16	73	89
4.3.2	remittances	7	7	14	–	2	2	7	9	16
4.3.3	other dependents	500	891	1391	47	86	133	547	977	1524
4.4	total : not in labour force	523	971	1494	47	88	135	570	1059	1629
5	all persons	977	1035	2012	113	93	206	1090	1128	2218

sample households with heads registered : 444   sample households with heads not-registered : 56

total no. of households : 5374

TABLE 4.4 : PERCENTAGE DISTRIBUTION OF EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS IN HOUSEHOLDS WITH REGISTERED AND NOT REGISTERED HEADS

serial no.	details of earners, earning dependents and non-earning dependents	number of persons in								
		registered households			not-registered households			all households		
		male	female	total	male	female	total	male	female	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	earners									
1.1	in labour force									
1.1.1	working	19.1	0.9	20.0	30.1	1.4	31.5	20.2	0.9	21.1
1.1.2	earner seeking employment	0.9	—	0.9	—	—	—	0.8	—	0.8
1.2	not in labour force									
1.2.1	getting cash doles	0.8	3.6	4.4	—	—	—	0.7	3.3	4.0
1.2.2	receiving remittances	0.2	0.3	0.5	—	1.0	1.0	0.2	0.4	0.6
1.3	total : earners	21.0	4.8	25.8	30.1	2.4	32.5	21.9	4.6	26.5
2	earning dependents									
2.1	in labour force									
2.1.1	working	1.2	2.2	3.4	1.0	1.0	2.0	1.2	2.1	3.3
2.2	not in labour force									
2.2.1	getting cash doles	0.0	—	0.0	—	—	—	0.0	—	0.0
2.2.2	receiving remittances	0.1	0.0	0.1	—	—	—	0.1	0.0	0.1
2.3	total : earning dependents	1.3	2.2	3.5	1.0	1.0	2.0	1.3	2.1	3.4
3	non-earning dependents									
3.1	in labour force									
3.1.1	seeking employment	1.3	0.2	1.5	1.0	—	1.0	1.3	0.1	1.4
3.2	not in labour force									
3.2.1	other dependents	24.9	44.3	69.2	22.8	41.7	64.5	24.7	44.0	68.7
3.3	total : non-earning dependents	26.2	44.5	70.7	23.8	41.7	65.5	26.0	44.1	70.1
4	all persons									
4.1	in labour force									
4.1.1	working	20.3	3.1	23.4	31.1	2.4	33.5	21.4	3.0	24.4
4.1.2	seeking employment	2.2	0.2	2.4	1.0	—	1.0	2.1	0.1	2.2
4.2	total : in labour force	22.5	3.3	25.8	32.1	2.4	34.5	23.5	3.1	26.6
4.3	not in labour force									
4.3.1	cash doles	0.8	3.6	4.4	—	—	—	0.7	3.3	4.0
4.3.2	remittances	0.3	0.3	0.6	—	1.0	1.0	0.3	0.4	0.7
4.3.3	other dependents	24.9	44.3	69.2	22.8	41.7	64.5	24.7	44.0	68.7
4.4	total : not in labour force	26.0	48.2	74.2	22.8	42.7	65.5	25.7	47.7	73.4
5	all persons	48.5	51.5	100.0	54.9	45.1	100.0	49.2	50.8	100.0

sample households with heads registered : 444   sample households with heads not registered : 56

total no. of households : 5374

TABLE 4.5 : AVERAGE NUMBER OF EARNERS, EARNING DEPENDENTS AND NON-EARN·
ING DEPENDENTS PER HOUSEHOLD BY SEX

serial no.	details of earners, earning dependents and non-earning dependents	number of persons in								
		registered households			not-registered households			all households		
		number of households : 444			number of households : 56			number of households : 500		
		male	female	total	male	female	total	male	female	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	earners									
1.1	in labour force									
1.1.1	working	0.87	0.04	0.91	1.11	0.05	1.16	0.89	0.04	0.93
1.1.2	earner seeking employment.	0.04	—	0.04	—	—	—	0.04	—	0.04
1.2	not in labour force									
1.2.1	getting cash doles	0.03	0.17	0.20	—	—	—	0.03	0.15	0.18
1.2.2	receiving remittances	0.01	0.01	0.02	—	0.04	0.04	0.01	0.01	0.02
1.3	total : earners	0.95	0.22	1.17	1.11	0.09	1.20	0.97	0.20	1.17
2	earning dependents									
2.1	in labour force									
2.1.1	working	0.05	0.10	0.15	0.03	0.04	0.07	0.05	0.09	0.14
2.2	not in labour force									
2.2.1	getting cash doles	0.00	—	0.00	—	—	—	0.00	—	0.00
2.2.2	receiving remittances	0.01	0.00	0.01	—	—	—	0.01	0.00	0.01
2.3	total : earning dependents	0.06	0.10	0.16	0.03	0.04	0.07	0.06	0.09	0.15
3	non-earning dependents									
3.1	in labour force									
3.1.1	seeking employment	0.06	0.01	0.07	0.04	—	0.04	0.06	0.01	0.07
3.2	not in labour force									
3.2.1	other dependents	1.13	2.00	3.13	0.82	1.55	2.37	1.09	1.96	3.05
3.3	total : non-earning dependents	1.19	2.01	3.20	0.86	1.55	2.41	1.15	1.97	3.12
4	all persons									
4.1	in labour force									
4.1.1	working	0.92	0.14	1.06	1.14	0.09	1.23	0.94	0.13	1.07
4.1.2	seeking employment	0.10	0.01	0.11	0.04	—	0.04	0.10	0.01	0.11
4.2	total : in labour force	1.02	0.15	1.17	1.18	0.09	1.27	1.04	0.14	1.18
4.3	not in labour force									
4.3.1	cash doles	0.03	0.17	0.20	—	—	—	0.03	0.15	0.18
4.3.2	remittances	0.02	0.01	0.03	—	0.04	0.04	0.02	0.01	0.03
4.3.3	other dependents	1.13	2.00	3.13	0.82	1.55	2.37	1.09	1.96	3.05
4.4	total : not in labour force	1.18	2.18	3.36	0.82	1.59	2.41	1.14	2.12	3.26
5	all persons	2.20	2.33	4.53	2.00	1.68	3.68	2.18	2.26	4.44

no. of households surveyed : 500   total no. of households : 5374

TABLE 5.1 : DISTRIBUTION OF POPULATION OF FARIDABAD BY SEX, AGE GROUP AND INDUSTRIAL STATUS (figures are in hundreds)

Columns: males = (3)–(8), females = (9)–(14), all persons = (15)–(20). Within each group the age-group sub-columns are: 0-14, 15-17, 18-59, 60-69, 70+, all ages.

sl. no. (1)	industrial status (2)	males 0-14 (3)	15-17 (4)	18-59 (5)	60-69 (6)	70+ (7)	all ages (8)	females 0-14 (9)	15-17 (10)	18-59 (11)	60-69 (12)	70+ (13)	all ages (14)	all persons 0-14 (15)	15-17 (16)	18-59 (17)	60-69 (18)	70+ (19)	all ages (20)
1	gainfully occupied	0.3	1.4	45.9	2.8	0.4	50.8	0.4	0.1	6.0	0.4	0.1	7.0	0.7	1.5	51.9	3.2	0.5	57.8
2	unemployed seeking employment	—	0.4	4.4	0.2	—	5.0	—	—	0.3	—	—	0.3	—	0.4	4.7	0.2	—	5.3
3	persons not in the labour force—	49.9	5.1	3.8	1.6	1.0	61.4	50.1	9.3	45.4	6.3	2.8	113.9	100.0	14.4	49.2	7.9	3.8	175.3
	.1 living on doles	—	—	0.2	0.3	0.2	0.7	—	—	0.9	0.1	—	1.0	—	—	1.1	0.4	0.2	1.7
	.2 receiving remittances	0.2	—	1.0	0.3	0.2	1.7	—	0.2	5.6	1.3	0.8	7.9	0.2	0.2	6.6	1.6	1.0	9.6
	.3 dependents	49.7	5.1	2.6	1.0	0.6	59.0	50.1	9.1	38.9	4.9	2.0	105.0	99.8	14.2	41.5	5.9	2.6	164.0
4	all industrial status	50.2	6.9	54.1	4.6	1.4	117.2	50.5	9.4	51.7	6.7	2.9	121.2	100.7	16.3	105.8	11.4	4.3	238.4

TABLE 5.2 : PERCENTAGE DISTRIBUTION OF POPULATION OF FARIDABAD BY SEX, AGE GROUP AND INDUSTRIAL STATUS

sl. no. (1)	industrial status (2)	males 0-14 (3)	15-17 (4)	18-59 (5)	60-69 (6)	70+ (7)	all ages (8)	females 0-14 (9)	15-17 (10)	18-59 (11)	60-69 (12)	70+ (13)	all ages (14)	all persons 0-14 (15)	15-17 (16)	18-59 (17)	60-69 (18)	70+ (19)	all ages (20)
1	gainfully occupied	0.3	1.2	39.1	2.4	0.4	43.4	0.4	0.1	4.9	0.4	0.1	5.9	0.3	0.6	21.8	1.3	0.2	24.2
2	unemployed seeking employment	—	0.4	3.7	0.2	—	4.3	—	—	0.3	—	—	0.3	—	0.2	2.0	0.1	—	2.3
3	persons not in the labour force—	42.6	4.3	3.2	1.4	0.8	52.3	41.3	7.7	37.3	5.2	2.3	93.8	41.9	6.1	20.5	3.4	1.6	73.5
	.1 living on doles	—	—	0.2	0.3	0.2	0.6	—	—	0.7	0.1	—	0.8	—	—	0.4	0.2	0.1	0.7
	.2 receiving remittances	0.2	—	0.8	0.3	0.2	1.5	—	0.2	4.6	1.1	0.6	6.5	0.1	0.1	2.7	0.7	0.4	4.0
	.3 dependents	42.4	4.3	2.2	0.8	0.4	50.1	41.3	7.5	32.0	4.0	1.7	86.5	41.8	6.0	17.4	2.5	1.1	68.8
4	all industrial status	42.9	5.9	46.0	4.0	1.2	100.0	41.7	7.8	42.5	5.6	2.4	100.0	42.2	6.9	44.3	4.8	1.8	100.0

no of households surveyed : 500   total no. of households : 5374

151

TABLE 5.3 : DISTRIBUTION OF SAMPLE POPULATION BY SEX, EDUCATION STANDARD AND INDUSTRIAL STATUS

sl. no.	sex	education standard	gain-fully occu-pied	unemployed seeking employment			all persons in labour force (col. 4+7)	persons not in labour force	all indus-trial status
				for the first time	not for first time	all (col. 5+6)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	55	2	5	7	62	221	283
2		literate but not middle	281	3	23	26	307	301	608
3		middle but not matric	78	1	7	8	86	42	128
4		matric and intermediate	56	—	5	5	61	6	67
5		graduates and post-graduates	3	—	1	1	4	—	4
6		all groups	473	6	41	47	520	570	1090
	females :								
7		illiterate	46	—	1	1	47	609	656
8		literate but not middle	13	—	2	2	15	419	434
9		middle but not matric	4	—	—	—	4	30	34
10		matric and intermediate	2	—	—	—	2	1	3
11		graduates and post-graduates	1	—	—	—	1	—	1
12		all groups	66	—	3	3	69	1059	1128
	all persons :								
13		illiterate	101	2	6	8	109	830	939
14		literate but not middle	294	3	25	28	322	720	1042
15		middle but not matric	82	1	7	8	90	72	162
16		matric and intermediate	58	—	5	5	63	7	70
17		graduates and post-graduates	4	—	1	1	5	—	5
18		all groups	539	6	44	50	589	1629	2218

TABLE 5.4 : PERCENTAGE DISTRIBUTION BY SEX, EDUCATION STANDARD AND INDUSTRIAL STATUS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	2.5	0.1	0.2	0.3	2.8	10.0	12.8
2		literate but not middle	12.7	0.2	1.0	1.2	13.9	13.6	27.5
3		middle, but not matric	3.5	0.0	0.3	0.3	3.8	1.9	5.7
4		matric and intermediate	2.5	—	0.2	0.2	2.7	0.3	3.0
5		graduates and post-graduates	0.1	—	0.1	0.1	0.2	—	0.2
6		all groups	21.3	0.3	1.8	2.1	23.4	25.8	49.2
	females :								
7		illiterate	2.1	—	0.0	0.0	2.1	27.4	29.5
8		literate but not middle	0.6	—	0.1	0.1	0.7	18.9	19.6
9		middle but not matric	0.2	—	—	—	0.2	1.3	1.5
10		matric and intermediate	0.1	—	—	—	0.1	0.0	0.1
11		graduates and post-graduates	0.1	—	—	—	0.1	—	0.1
12		all groups	3.1	—	0.1	0.1	3.2	47.6	50.8
	all persons :								
13		illiterate	4.6	0.1	0.2	0.3	4.9	37.4	42.3
14		literate but not middle	13.3	0.2	1.1	1.3	14.6	32.5	47.1
15		middle but not matric	3.7	0.0	0.3·	0.3	4.0	3.2	7.2
16		matric and intermediate	2.6	—	0.2	0.2	2.8	0.3	3.1
17		graduates and post-graduates	0.2	—	0.1	0.1	0.3	—	0.3
18		all groups	24.4	0.3	1.9	2.2	26.6	73.4	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 5.5 : PERCENTAGE DISTRIBUTION BY EDUCATION STANDARD AND SEX FOR EACH INDUSTRIAL STATUS

sl. no.	sex	education standard	industrial status						
			gain-fully occu-pied	unemployed seeking employment			all persons in labour force (col. 4+7)	persons not in labour force	all indus-trial status
				for the first time	not for first time	all (col. 5+6)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	10.2	33.3	11.4	14.0	10.5	13.6	12.8
2		literate, but not middle	52.1	50.0	52.3	52.0	52.1	18.4	27.5
3		middle but not matric	14.5	16.7	15.9	16.0	14.6	2.6	5.7
4		matric and intermediate	10.4	—	11.3	10.0	10.4	0.4	3.0
5		graduates and post-graduates	0.6	—	2.3	2.0	0.7	—	0.2
6		all groups	87.8	100.0	93.2	94.0	88.3	35.0	49.2
	females :								
7		illiterate	8.5	—	2.3	2.0	8.0	37.4	29.5
8		literate but not middle	2.4	—	4.5	4.0	2.5	25.7	19.6
9		middle but not matric	0.7	—	—	—	0.7	1.8	1.5
10		matric and intermediate	0.4	—	—	—	0.3	0.1	0.1
11		graduates and post-graduates	0.2	—	—	—	0.2	—	0.1
12		all groups	12.2	—	6.8	6.0	11.7	65.0	50.8
	all persons :								
13		illiterate	18.7	33.3	13.7	16.0	18.5	51.0	42.3
14		literate but not middle	54.5	50.0	56.8	56.0	54.6	44.1	47.1
15		middle but not matric	15.2	16.7	15.9	16.0	15.3	4.4	7.2
16		matric and intermediates	10.8	—	11.3	10.0	10.7	0.5	3.1
17		graduates and post-graduates	0.8	—	2.3	2.0	0.9	—	0.3
18		all groups	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 5.6 : PERCENTAGE DISTRIBUTION BY EDUCATION STANDARD AND INDUSTRIAL STATUS FOR MALES, FEMALES AND ALL PERSONS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	5.0	0.2	0.5	0.7	5.7	20.2	25.9
2		literate but not middle	25.8	0.3	2.1	2.4	28.2	27.6	55.8
3		middle but not matric	7.2	0.1	0.6	0.7	7.9	3.9	11.8
4		matric and intermediate	5.1	—	0.5	0.5	5.6	0.5	6.1
5		graduates and post-graduates	0.3	—	0.1	0.1	0.4	—	0.4
6		all groups	43.4	0.6	3.8	4.4	47.8	52.2	100.0
	females :								
7		illiterate	4.1	—	0.1	0.1	4.2	54.0	58.2
8		literate but not middle	1.1	—	0.2	0.2	1.3	37.1	38.4
9		middle but not matric	0.4	—	—	—	0.4	2.6	3.0
10		matric and intermediate	0.2	—	—	—	0.2	0.1	0.3
11		graduates and post-graduates	0.1	—	—	—	0.1	—	0.1
12		all groups	5.9	—	0.3	0.3	6.2	93.8	100.0
	all persons :								
13		illiterate	4.6	0.1	0.2	0.3	4.9	37.4	42.3
14		literate but not middle	13.3	0.2	1.1	1.3	14.6	32.5	47.1
15		middle but not matric	3.7	0.0	0.3	0.3	4.0	3.2	7.2
16		matric and intermediate	2.6	—	0.2	0.2	2.8	0.3	3.1
17		graduates and post-graduates	0.2	—	0.1	0.1	0.3	—	0.3
18		all groups	24.4	0.3	1.9	2.2	26.6	73.4	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 5.7 : PERCENTAGE DISTRIBUTION BY SEX AND INDUSTRIAL STATUS FOR EACH EDUCATION STANDARD

sl. no.	sex	education standard	gain-fully occu-pied	unemployed seeking employment			all persons in labour force (col. 4+7)	persons not in labour force	all indus-trial status
				for the first time	not for first time	all (col. 5+6)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	19.4	0.7	1.8	2.5	21.9	78.1	100.0
2		literate but not middle	46.2	0.5	3.8	4.3	50.5	49.5	100.0
3		middle but not matric	60.9	0.8	5.5	6.3	67.2	32.8	100.0
4		matric and intermediate	83.6	—	7.5	7.5	91.1	8.9	100.0
5		graduates and post-graduates	75.0	—	25.0	25.0	100.0	—	100.0
6		all groups	43.4	0.6	3.7	4.3	47.7	52.3	100.0
	females :								
7		illiterate	7.0	—	0.2	0.2	7.2	92.8	100.0
8		literate but not middle	3.0	—	0.5	0.5	3.5	96.5	100.0
9		middle but not matric	11.8	—	—	—	11.8	88.2	100.0
10		matric and intermediate	66.7	—	—	—	66.7	33.3	100.0
11		graduates and post-graduates	100.0	—	—	—	100.0	—	100.0
12		all groups	5.8	—	0.3	0.3	6.1	93.9	100.0
	all persons :								
13		illiterate	10.8	0.2	0.6	0.8	11.6	88.4	100.0
14		literate but not middle	28.2	0.3	2.4	2.7	30.9	69.1	100.0
15		middle but not matric	50.6	0.6	4.3	4.9	55.6	44.4	100.0
16		matric and intermediate	82.9	—	7.1	7.1	90.0	10.0	100.0
17		graduates and post-graduates	80.0	—	20.0	20.0	100.0	—	100.0
18		all groups	24.3	0.3	2.0	2.3	26.6	73.4	100.0

TABLE 5.8 : DISTRIBUTION OF ESTIMATED POPULATION OF FARIDABAD TOWNSHIP BY SEX, EDUCATION STANDARD AND INDUSTRIAL STATUS

(figures in hundreds)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	males :								
1		illiterate	5.9	0.2	0.5	0.7	6.6	23.8	30.4
2		literate but not middle	30.2	0.3	2.5	2.8	33.0	32.4	65.4
3		middle but not matric	8.4	0.1	0.8	0.9	9.3	4.5	13.8
4		matric and intermediate	6.0	—	0.5	0.5	6.5	0.7	7.2
5		graduates and post-graduates	0.3	—	0.1	0.1	0.4	—	0.4
6		all groups	50.8	0.6	4.4	5.0	55.8	61.4	117.2
	females :								
7		illiterate	4.9	—	0.1	0.1	5.0	65.5	70.5
8		literate but not middle	1.4	—	0.2	0.2	1.6	45.0	46.6
9		middle but not matric	0.4	—	—	—	0.4	3.3	3.7
10		matric and intermediate	0.2	—	—	—	0.2	0.1	0.3
11		graduates and post-graduates	0.1	—	—	—	0.1	—	0.1
12		all groups	7.0	—	0.3	0.3	7.3	113.9	121.2
	all persons :								
13		illiterate	10.8	0.2	0.6	0.8	11.6	89.3	100.9
14		literate but not middle	31.6	9.3	2.7	3.0	34.6	77.4	112.0
15		middle but not matric	8.8	0.1	0.8	0.9	9.7	7.8	17.5
16		matric and intermediate	6.2	—	0.5	0.5	6.7	0.8	7.5
17		graduates and post-graduates	0.4	—	0.1	0.1	0.5	—	0.5
18		all groups	57.8	0.6	4.7	5.3	63.1	175.3	238.4

TABLE 5.9 :   PERCENTAGE DISTRIBUTION OF PERSONS IN REGISTERED AND UNREGISTERED HOUSEHOLDS BY SEX, EDUCATION STANDARD AND INDUSTRIAL STATUS

sl. no.	sex	industrial status	registered no. of h.h. : 444 / no. of persons 2012						unregistered no. of h.h. : 56 / no. of persons : 206					
			illiterate	literate but not middle	middle but not matric	matric and intermediate	graduates & post-graduate	all	illiterate	literate but not middle	middle but not matric	matric and intermediate	graduates & post-graduates	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	males	gainfully occupied	12.2	62.4	17.1	8.3	—	100.0	7.8	40.6	12.5	34.4	4.7	100.0
2		unemployed	15.5	55.6	17.8	8.9	2.2	100.0	—	50.0	—	50.0	—	100.0
3		not in labour force	39.0	52.5	7.5	1.0	—	100.0	36.2	55.3	6.4	2.1	—	100.0
4		total	26.7	56.8	12.0	4.4	0.1	100.0	19.5	46.9	9.7	21.2	2.7	100.0
5	females	gainfully occupied	72.1	18.0	6.6	3.3	—	100.0	40.0	40.0	—	—	20.0	100.0
6		unemployed	33.3	66.7	—	—	—	100.0	—	—	—	—	—	100.0
7		not in labour force	58.3	39.4	2.3	—	—	100.0	48.9	41.0	9.0	1.1	—	100.0
8		total	59.0	38.3	2.5	0.2	—	100.0	48.4	40.9	8.6	1.0	1.1	100.0
9	all	gainfully occupied	20.0	56.6	15.7	7.7	—	100.0	10.1	40.6	11.6	31.9	5.8	100.0
10		unemployed	16.7	56.2	16.7	8.3	2.1	100.0	—	50.0	—	50.0	—	100.0
11		not in labour force	51.5	44.1	4.1	0.3	—	100.0	44.4	45.9	8.2	1.5	—	100.0
12		total	43.3	47.3	7.1	2.3	0.0	100.0	32.6	44.2	9.2	12.1	1.9	100.0

no. of households surveyed :500   total no. of households : 5374

TABLE 6.1 : EARNERS AND EARNING DEPENDENTS BY SEX, BY TYPE OF OCCUPATION AND AVERAGE MONTHLY INCOME PER EARNING PERSON FROM PRINCIPAL AND SUBSIDIARY OCCUPATION AND OTHER SOURCES

			no occupation				only subsidiary occupation					only principal occupation		principal & subsidiary both				all classes					
sl. no.	earners and earning dependents	sex	no. of persons	av. income (Rs.)/person doles	re-mitt-ances	total	no. of persons	doles	re-mitt-ances	subsid. occup.	total	no. of persons	av. monthly income (Rs.) per person	no. of persons	princ. occup.	subs. occup.	total	no. of persons	princ. occup.	subs. occup.	cash dole	re-mitt-ances	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
1	earners	male	19	37.2	17.3	54.5	9	18.9	43.8	8.0	70.7	355	69.3	102	60.7	9.7	70.4	485	63.6	2.2	1.8	1.5	69.1
2		female	49	27.4	4.4	31.8	32	43.9	3.3	5.3	52.5	17	64.7	3	79.4	4.1	83.5	101	13.3	1.8	27.2	3.2	45.5
3		total	68	30.1	8.0	38.1	41	38.5	12.2	5.9	56.6	372	69.1	105	61.3	9.5	70.8	586	54.9	2.1	6.2	1.7	64.9
4	earning dependents	male	3	6.0	15.0	21.0	—	—	—	—	—	20	11.8	6	9.9	3.6	13.5	29	10.2	0.7	0.6	1.6	13.1
5		female	1	—	15.0	15.0	—	—	—	—	—	40	6.6	6	10.0	6.4	16.4	47	6.9	0.8	—	0.3	8.0
6		total	4	4.5	15.0	19.5	—	—	—	—	—	60	8.3	12	10.0	5.0	15.0	76	8.2	0.8	0.2	0.8	10.0
7	earners and earning dependents	male	22	33.0	17.0	50.1	9	18.9	43.8	8.0	70.7	375	66.2	108	57.9	9.4	67.3	514	60.6	2.1	1.7	1.5	65.9
8		female	50	26.8	14.6	31.5	32	43.9	3.3	5.3	52.5	57	23.9	9	33.2	5.6	38.6	148	11.2	1.5	18.6	2.3	33.6
9		total	72	28.7	8.4	37.2	41	38.5	12.2	5.9	56.6	432	60.7	117	56.0	9.1	65.1	662	49.6	2.0	5.5	1.6	58.7

number of households surveyed : 500   total number of households : 5374

TABLE 6.2 : INCOME OF EARNERS AND EARNING DEPENDENTS FROM PRINCIPAL AND SUBSIDIARY OCCUPATION AND DOLES AND REMITTANCES AS PERCENT OF TOTAL INCOME FROM ALL THESE SOURCES

sl. no.	earner or earning dependent	sex	income from different sources as percent of total income						all sources
			principal occupation	subsidiary occupation	unearned income			
					cash doles	remittances	total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
households with head registered								
1	earners	male	77.9	2.8	2.5	2.1	4.6	85.3
2		female	3.3	0.5	7.9	0.9	8.8	12.6
3		total	81.2	3.3	10.4	3.0	13.4	97.9
4	earning dependents	male	0.8	0.1	0.1	0.1	0.2	1.1
5		female	0.9	0.1	—	0.0	0.0	1.0
6		total	1.7	0.2	0.1	0.1	0.2	2.1
7	earners and earning dependents	male	78.7	2.9	2.6	2.2	4.8	86.4
8		female	4.2	0.6	7.9	0.9	8.8	13.6
9		total	82.9	3.5	10.5	3.1	13.6	100.0
households with head not registered								
10	earners	male	92.4	2.4	—	—	—	94.8
11		female	4.3	0.1	—	0.4	0.4	4.8
12		total	96.7	2.5	—	0.4	0.4	99.6
13	earning dependents	male	0.3	—	—	—	—	0.3
14		female	0.1	—	—	—	—	0.1
15		total	0.4	—	—	—	—	0.4
16	earners and earning dependents	male	92.7	2.4	—	—	—	95.1
17		female	4.4	0.1	—	0.4	0.4	4.9
18		total	97.1	2.5	—	0.4	0.4	100.0
all households								
19	earners	male	79.5	2.7	2.3	1.8	4.1	86.3
20		female	3.4	0.5	7.1	0.8	7.9	11.8
21		total	82.9	3.2	9.4	2.6	12.0	98.1
22	earning dependents	male	0.8	0.1	0.0	0.1	0.1	1.0
23		female	0.8	0.1	—	0.0	0.0	0.9
24		total	1.6	0.2	0.0	0.1	0.1	1.9
25	earners and earning dependents	male	80.3	2.8	2.3	1.9	4.2	87.3
26		female	4.2	0.6	7.1	0.8	7.9	12.7
27		total	84.5	3.4	9.4	2.7	12.1	100.0

number of households surveyed : 500   total no. of households : 5374

TABLE 6.3 : AVERAGE MONTHLY INCOME IN RUPEES OF EARNERS AND EARNING DEPENDENTS OF REGISTERED AND UNREGISTERED HOUSEHOLDS

sl. no.	earner or earning dependent	sex	earner or earning dependents		average monthly income per person (Rs.)					total
			no.	percent	principal occupation	subsidiary occupation	unearned			
							cash dole	remittance	total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	households with head registered									
1	earners	male	423	63.9	46.7	1.8	2.1	1.7	3.8	52.3
2		female	96	14.5	8.6	1.8	28.6	2.9	31.5	41.9
3		total	519	78.4	39.7	1.8	7.0	1.9	8.9	50.4
4	earning dependents	male	27	4.1	9.7	0.8	0.7	1.6	2.3	12.8
5		female	45	6.8	6.9	0.9	—	0.3	0.3	8.1
6		total	72	10.9	7.9	0.8	0.3	0.8	1.1	9.8
7	earners and earning dependents	male	450	68.0	44.5	1.8	2.0	1.7	3.7	50.0
8		female	141	21.3	8.1	1.5	19.5	2.1	21.6	31.2
9		total	591	89.3	35.8	1.7	6.2	1.8	8.0	45.5
	households with head not registered									
10	earners	male	62	9.4	178.9	4.7	—	—	—	183.6
11		female	5	0.7	102.4	1.6	—	9.0	9.0	113.0
12		total	67	10.1	173.1	4.5	—	0.7	0.7	178.3
13	earning dependents	male	2	0.3	17.5	—	—	—	—	17.5
14		female	2	0.3	7.0	—	—	—	—	7.0
15		total	4	0.6	12.3	—	—	—	—	12.3
16	earners and earning dependents	male	64	9.7	173.8	4.6	—	—	—	178.4
17		female	7	1.0	75.1	1.1	—	6.4	6.4	82.6
18		total	71	10.7	164.1	4.3	—	0.6	0.6	169.0
	all households									
19	earners	male	485	73.3	63.6	2.2	1.8	1.5	3.3	69.1
20		female	101	15.2	13.3	1.8	27.2	3.2	30.4	45.5
21		total	586	88.5	54.9	2.1	6.2	1.7	7.9	64.9
22	earning dependents	male	29	4.4	10.2	0.7	0.6	1.6	2.2	13.1
23		female	47	7.1	6.9	0.8	—	0.3	0.3	8.0
24		total	76	11.5	8.2	0.8	0.2	0.8	1.0	10.0
25	earners and earning dependents	male	514	77.7	60.6	2.1	1.7	1.5	3.2	65.9
26		female	148	22.3	11.2	1.5	18.6	2.3	20.9	33.6
27		total	662	100.0	49.6	2.0	5.5	1.6	7.1	58.7

no. of sample households : 500   total no. of households : 5374

TABLE 6.4 : SUBSIDIARY OCCUPATION AND AVERAGE MONTHLY INCOME THEREFROM DURING DECEMBER 1953—FEBRUARY 1954 OF MALE AND FEMALE EARNERS AND EARNING DEPENDENTS HAVING ANY SUBSIDIARY OCCUPATION.

sl. no.	subsidiary occupation	males			females			all persons		
		no.	percent of all male earners and earning dependents	average monthly income Rs.	no.	percent of all female earners and earning dependents	average monthly income Rs.	no.	percent of all earners and earning dependents	average monthly income Rs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	wood and dung collection for fuel	32	27.4	5.6	26	63.5	4.2	58	36.7	5.0
2	vegetable growing	8	6.8	2.5	2	4.9	—	10	6.3	2.0
3	cow keeping	31	26.5	15.8	1	2.5	45.0	32	20.2	16.7
4	goat keeping	21	17.9	4.3	4	9.8	2.7	25	15.8	3.1
5	poultry keeping	2	1.7	0.3	1	2.4	1.3	3	1.9	0.6
6	tailoring	2	1.7	18.5	3	7.3	5.9	5	3.2	12.1
7	reeling	—	—	—	1	2.4	9.7	1	0.6	9.7
8	spinning	1	0.8	1.0	1	2.4	3.3	2	1.3	2.2
9	basket making	1	0.8	0.6	1	2.4	1.3	2	1.3	1.0
10	radio repairing	1	0.8	1.7	—	—	—	1	0.6	1.7
11	mechanic	1	0.8	37.0	—	—	—	1	0.6	36.7
12	grocer	2	1.7	17.5	—	—	—	2	1.3	17.5
13	dealer in medicine	1	0.9	5.3	—	—	—	1	0.6	5.3
14	pakora shop	1	0.9	20.7	—	—	—	1	0.6	20.7
15	milk selling	2	1.7	—	—	—	—	2	1.3	—
16	hawker of vegetables	1	0.9	29.7	—	—	—	1	0.6	29.7
17	vaid	1	0.9	2.3	—	—	—	1	0.6	2.3
18	dai	—	—	—	1	2.4	7.7	1	0.7	7.7
19	astrologer	1	0.9	5.0	—	—	—	1	0.7	5.0
20	manual labour	5	4.3	9.5	—	—	—	5	3.2	9.5
21	petty contractor	2	1.7	10.3	—	—	—	2	1.3	10.3
22	rent receiver	1	0.9	0.6	—	—	—	1	0.6	0.6
23	all occupations	117	100.0	8.7	41	100.0	5.3	158	100.0	7.8

TABLE 6.5 : PRESENT OCCUPATION AND OCCUPATIONAL PREFERENCE OF EARNERS, EARNING DEPENDENTS AND NON-EARNING DEPENDENTS SEEKING EMPLOYMENT

sl. no.	present occupation	total no. of persons	no. not desiring change	no. of persons showing preference for job								per-cent not desiring change	percent of persons showing preference for job								
				unspecified	clerk	industrial worker	artisan	trader	own enterprize	peon, watchman	unskilled labour		unspecified	clerk	industrial worker	artisan	trader	own enterprize	peon, watchman	unskilled labour	all jobs
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	superior administrative and executive work	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	100.0	—	—	—	100.0
	superior technical—																				
2	engineering	1	1	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	100.0
3	medical and health	5	4	—	1	—	—	—	—	—	—	80.0	—	20.0	—	—	—	—	—	—	100.0
4	education	11	10	—	—	1	—	—	—	—	—	90.9	—	—	9.1	—	—	—	—	—	100.0
5	all others	4	2	—	—	—	—	—	1	1	—	50.0	—	—	—	—	—	25.0	25.0	—	100.0
6	subordinate administrative and executive work	45	36	—	2	4	—	2	—	1	—	80.0	—	4.4	8.9	—	4.5	—	2.2	—	100.0
7	ministerial work	22	19	—	—	1	1	1	—	—	—	86.4	—	—	4.6	4.5	4.5	—	—	—	100.0
8	subordinate technical work	120	78	—	2	14	7	5	9	5	—	65.0	—	1.7	11.6	5.8	4.2	7.5	4.2	—	100.0
9	grass cutting; fuel collection etc.	30	19	—	4	—	1	2	1	3	—	63.3	—	13.3	—	3.3	6.7	3.4	10.0	—	100.0
10	animal husbandry	13	9	—	—	2	1	—	—	—	1	69.2	—	—	15.4	7.7	—	—	—	7.7	100.0
11	confectioners	14	11	—	—	—	1	2	—	—	—	78.6	—	—	—	7.1	14.3	—	—	—	100.0
12	trade & brokerage	30	19	—	—	2	—	5	—	3	1	63.3	—	—	6.7	—	16.7	—	10.0	3.3	100.0
13	unskilled labour	134	55	—	1	29	4	13	5	27	—	41.1	—	0.7	21.6	3.0	9.7	3.7	20.2	—	100.0
14	others— unspecified	8	7	—	—	—	—	1	—	—	—	87.5	—	—	—	—	12.5	—	—	—	100.0
15	cashdole and remittance holders	82	69	—	—	1	5	2	—	4	1	84.2	—	—	1.2	6.1	2.4	—	4.9	1.2	100.0
16	unemployed, seeking employment	38	—	3	4	7	4	6	3	3	8	—	7.9	10.5	18.4	10.5	15.8	7.9	7.9	21.1	100.0
17	all	588	339	3	14	61	24	40	19	47	11	60.7	0.6	2.5	10.9	4.3	7.2	3.4	8.4	2.0	100.0

no. of sample households : 400   total no. of households : 5374

TABLE 6.6 : PRESENT OCCUPATION OF WORKING EARNERS AND EARNING DEPENDENTS (EXCLUDING THOSE LIVING ON DOLES AND REMITTANCES) OF HOUSEHOLDS WITH HEADS REGISTERED AND NOT-REGISTERED

sl. no.	present occupation	household with head registered									household with head not-registered									all households								
		males			females			all			males			females			all			males			females			all		
		earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all	earner	earning dependent	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
1	superior administrative & executive work	1	–	1	–	–	–	1	–	1	3	–	3	–	–	–	3	–	3	4	–	4	–	–	–	4	–	4
	superior technical work																											
2	engineering	–	–	–	–	–	–	–	–	–	2	–	2	–	–	–	2	–	2	2	–	2	–	–	–	2	–	2
3	medical and health	3	–	3	1	–	1	4	–	4	–	–	–	1	–	1	1	–	1	3	–	3	2	–	2	5	–	5
4	teaching	9	–	9	6	–	6	15	–	15	–	–	–	–	–	–	–	–	–	9	–	9	6	–	6	15	–	15
5	all others	4	–	4	–	–	–	4	–	4	1	–	1	–	–	–	1	–	1	5	–	5	–	–	–	5	–	5
6	subordinate administrative and executive work	42	1	43	2	–	2	44	1	45	9	–	9	–	–	–	9	–	9	51	1	52	2	–	2	53	1	54
7	ministerial work	22	–	22	–	–	–	22	–	22	4	–	4	–	–	–	4	–	4	26	–	26	–	–	–	26	–	26
8	subordinate technical work	100	4	104	–	14	14	100	18	118	29	2	31	–	2	2	29	4	33	129	6	135	–	16	16	129	22	151
9	grass cutters, fuel gatherers, gardeners etc.	13	4	17	1	12	13	14	16	30	2	–	2	–	–	–	2	–	2	15	4	19	1	12	13	16	16	32
10	rearer of animals for their products	–	1	1	–	11	11	–	12	12	–	–	–	1	–	1	1	–	1	–	1	1	1	11	12	1	12	13
11	manufacturer of food and beverages	15	3	18	–	–	–	15	3	18	1	–	1	–	–	–	1	–	1	16	3	19	–	–	–	16	3	19
12	traders, brokers, agents	38	2	40	–	1	1	38	3	41	1	–	1	–	–	–	1	–	1	39	2	41	–	1	1	39	3	42
13	unskilled labourers	128	9	137	7	6	13	135	15	150	9	–	9	1	–	1	10	–	10	137	9	146	8	6	14	145	15	160
14	others unspecified	10	–	10	–	–	–	10	–	10	1	–	1	–	–	–	1	–	1	11	–	11	–	–	–	11	–	11
15	all	385	24	409	17	44	61	402	68	470	62	2	64	3	2	5	65	4	69	447	26	473	20	46	66	467	72	539

number of households surveyed : 500   total number of households : 5374

TABLE 6.7 : DISTRIBUTION OF THE WORKING POPULATION OF THE FARIDABAD TOWN-
SHIP BY THE PRESENT OCCUPATION OF WORKING EARNERS AND EARNING
DEPENDENTS IN REGISTERED AND UNREGISTERED HOUSEHOLDS

(figures are in hundreds)

sl. no.	present occupation	registered households			not registered households			all households		
		earners	earning dpdts.	total	earners	earning dpdts.	total	earners	earning dpdts.	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	superior admin. and execu. work	0.1	—	0.1	0.3	—	0.3	0.4	—	0.4
	superior technical work—									
2	engineering	—	—	—	0.2	—	0.2	0.2	—	0.2
3	medical and health	0.4	—	0.4	0.1	—	0.1	0.5	—	0.5
4	teaching	1.6	—	1.6	—	—	—	1.6	—	1.6
5	all others	0.4	—	0.4	0.1	—	0.1	0.5	—	0.5
6	subordinate adm. & execu. work	4.7	0.1	4.8	1.0	—	1.0	5.7	0.1	5.8
7	ministerial work	2.4	—	2.4	0.4	—	0.4	2.8	—	2.8
8	subordinate technical work	10.8	2.0	12.8	3.1	0.4	3.5	13.9	2.4	16.3
9	grass-cutters, fuel gatherers, gardeners	1.5	1.7	3.2	0.2	—	0.2	1.7	1.7	3.4
10	rearers of animals (cow keeping, poultry etc.)	—	1.3	1.3	0.1	—	0.1	0.1	1.3	1.4
11	manufacturers of cooked food and beverages	1.6	0.3	1.9	0.1	—	0.1	1.7	0.3	2.0
12	traders, brokers	4.1	0.3	4.4	0.1	—	0.1	4.2	0.3	4.5
13	unskilled labourers	14.5	1.6	16.1	1.1	—	1.1	15.6	1.6	17.2
14	others— unspecified	1.1	—	1.1	0.1	—	0.1	1.2	—	1.2
15	all occupations	43.2	7.3	50.4	6.9	0.4	7.3	50.1	7.7	57.8
16	estimated no. of households		47.7			6.0			53.7	
17	estimated population		216.3			22.1			238.4	

TABLE 6.8 : PERCENTAGE DISTRIBUTION OF THE WORKING POPULATION BY THE
PRESENT OCCUPATION OF WORKING EARNERS AND EARNING DEPENDENTS
IN REGISTERED AND UNREGISTERED HOUSEHOLDS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	superior admin. and execu. work	0.2	—	0.2	0.6	—	0.6	0.8	—	0.8
	superior technical work—									
2	engineering	—	—	—	0.4	—	0.4	0.4	—	0.4
3	medical and health	0.7	—	0.7	0.2	—	0.2	0.9	—	0.9
4	teaching	2.8	—	2.8	—	—	—	2.8	—	2.8
5	all others	0.7	—	0.7	0.2	—	0	0.9	—	0.9
6	subordinate admin. & execu. work	8.2	0.2	8.4	1.6	—	1.6	9.8	0.2	10.0
7	ministerial work	4.1	—	4.1	0.7	—	0.7	4.8	—	4.8
8	subordinate technical work	18.6	3.3	21.9	5.4	0.7	6.1	24.0	4.0	28.0
9	grass-cutters, fuel gatherers, gardeners	2.6	3.0	5.6	0.4	—	0.4	3.0	3.0	6.0
10	rearers of animals (cow keeping, poultry etc.)	—	2.2	2.2	0.2	—	0.2	0.2	2.2	2.4
11	manufacturers of cooked food (halwais etc.)	2.8	0.6	3.4	0.2	—	0.2	3.0	0.6	3.6
12	traders, brokers	7.1	0.5	7.6	0.2	—	0.2	7.3	0.5	7.8
13	unskilled labourers	25.0	2.8	27.8	1.8	—	1.8	26.8	2.8	29.6
14	others— unspecified	1.8	—	1.8	0.2	—	0.2	2.0	—	2.0
15	all occupations	74.6	12.6	87.2	12.1	0.7	12.8	86.7	13.3	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 6.9 : PERCENTAGE DISTRIBUTION OF WORKING POPULATION OF FARIDABAD TOWNSHIP BY THE PRESENT OCCUPATION OF WORKING EARNERS AND EARNING DEPENDENTS FOR MALES AND FEMALES SEPARATELY

sr. no.	present occupation	male			female			all		
		earners	earning dpdts.	total	earners	earning dpdts.	total	earners	earning dpdts.	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	superior admin & execu. work	0.8	—	0.8	—	—	—	0.8	—	0.8
	superior technical work—									
2	engineering	0.4	—	0.4	—	—	—	0.4	—	0.4
3	medical and health	0.6	—	0.6	3.0	—	3.0	0.9	—	0.9
4	teaching	1.9	—	1.9	9.1	—	9.1	2.8	—	2.8
5	all others	1.1	—	1.1	—	—	—	0.9	—	0.9
6	subordinate administrative and executive work	10.8	0.2	11.0	3.0	—	3.0	9.8	0.2	10.0
7	ministerial work	5.5	—	5.5	—	—	—	4.8	—	4.8
8	subordinate technical work	27.3	1.3	28.6	—	24.3	24.3	24.0	4.0	28.0
9	grass-cutters, fuel gatherers, gardeners	3.2	0.8	4.0	1.5	18.2	19.7	3.0	3.0	6.0
10	rearers of animals (cow keeping poultry etc.)	—	0.2	0.2	1.5	16.7	18.2	0.2	2.2	2.4
11	manufacturers of cooked food (halwai etc.)	3.4	0.6	4.0	—	—	—	3.0	0.6	3.6
12	traders, brokers	8.3	0.4	8.7	—	1.5	1.5	7.3	0.5	7.8
13	unskilled labourers	29.0	1.9	30.9	12.1	9.1	21.2	26.8	2.8	29.6
14	others— unspecified	2.3	—	2.3	—	—	—	2.0	—	2.0
15	all occupations	94.6	5.4	100.0	30.2	69.8	100.0	86.7	13.3	100.0

TABLE 6.10 : PERCENTAGE DISTRIBUTION OF WORKING POPULATION FOR EACH OCCUPATION

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	superior admin. & execu. work	100.0	—	100.0	—	—	—	100.0	—	100.0
	superior technical work—									
2	engineering	100.0	—	100.0	—	—	—	100.0	—	100.0
3	medical and health	60.0	—	60.0	40.0	—	40.0	100.0	—	100.0
4	teaching	60.0	—	60.0	40.0	—	40.0	100.0	—	100.0
5	all others	100.0	—	100.0	—	—	—	100.0	—	100.0
6	subordinate administrative and executive work	94.4	1.9	96.3	3.7	—	3.7	98.1	1.9	100.0
7	ministerial work	100.0	—	100.0	—	—	—	100.0	—	100.0
8	subordinate technical work	85.4	4.0	89.4	—	10.6	10.6	85.4	14.6	100.0
9	grass-cutters, fuel gatherers, gardeners	46.9	12.5	59.4	3.1	37.5	40.6	50.0	50.0	100.0
10	rearers of animals (cow keeping, poultry etc.)	—	7.7	7.7	7.7	84.6	92.3	7.7	92.3	100.0
11	manufacturers of cooked food (halwai etc.)	84.2	15.8	100.0	—	—	—	84.2	15.8	100.0
12	traders, brokers	92.8	2.4	95.2	—	4.8	4.8	92.8	7.2	100.0
13	unskilled labourers	85.6	5.6	91.2	5.0	3.8	8.8	90.6	9.4	100.0
14	others— unspecified	100.0	—	100.0	—	—	—	100.0	—	100.0
15	all occupations	83.0	4.8	87.8	3.7	8.5	12.2	86.7	13.3	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 6.11 : DISTRIBUTION OF THE GAINFULLY EMPLOYED BY THEIR PRINCIPAL OCCUPATION AND INCOME THEREFROM FOR THE MONTH OF FEBRUARY 1954

sl. no.	principal occupation	income (Rs.)								
		0–25	26–50	51–75	76–100	101–125	126–150	151–200	201–	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	working earners									
1	superior administrative and executive	—	1	—	1	—	—	1	1	4
	superior technical—									
2	engineering	—	—	—	—	—	—	—	2	2
3	medical and health	1	—	1	1	—	—	1	1	5
4	teaching	—	—	4	2	9	—	—	—	15
5	all others	1	3	—	—	1	—	—	—	5
6	subordinate administrative and executive	—	2	34	9	1	1	3	3	53
7	ministerial work	—	—	2	8	9	2	3	2	26
8	subordinate technical	11	22	44	34	7	5	2	4	129
9	grass-cutting, fuel collection, gardening	11	1	4	—	—	—	—	—	16
10	rearers of animals for products	—	1	—	—	—	—	—	—	1
11	manufacturers of food & beverages	6	5	—	3	1	—	—	—	16
12	traders, brokers and agents	5	15	12	5	2	—	1	—	39
13	unskilled labour	24	81	37	2	—	—	—	1	145
14	others : unspecified	3	2	2	3	—	—	1	—	11
15	all occupations	62	133	140	68	30	8	12	14	467
16	percentage	13.3	28.5	30.0	14.5	6.4	1.7	2.6	3.0	100.0
	working earning dependents									
17	subordinate administrative and executive	1	—	—	—	—	—	—	—	1
18	subordinate technical work	21	1	—	—	—	—	—	—	22
19	grass-cutting, fuel collection, gardening	16	—	—	—	—	—	—	—	16
20	rearers of animals for products	12	—	—	—	—	—	—	—	12
21	manufacturers of food and beverages	3	—	—	—	—	—	—	—	3
22	traders, brokers and agents	3	—	—	—	—	—	—	—	3
23	unskilled labour	14	1	—	—	—	—	—	—	15
24	all occupations	70	2	—	—	—	—	—	—	72
25	percentage	97.2	2.8	—	—	—	—	—	—	100.0
	all working earners and earning dependents									
26	superior administrative and executive	—	1	—	1	—	—	1	1	4
	superior technical—									
27	engineering	—	—	—	—	—	—	—	2	2
28	medical and health	1	—	1	1	—	—	1	1	5
29	teaching	—	—	4	2	9	—	—	—	15
30	all others	1	3	—	—	1	—	—	—	5
31	subordinate administrative and executive	1	2	34	9	1	1	3	3	54
32	ministerial work	—	—	2	8	9	2	3	2	26
33	subordinate technical	32	23	44	34	7	5	2	4	151
34	grass-cutting, fuel collection, gardening	27	1	4	—	—	—	—	—	32
35	rearers of animals for products	12	1	—	—	—	—	—	—	13
36	manufacturers of food & beverages	9	5	—	3	1	—	1	—	19
37	traders, brokers and agents	8	15	12	5	2	—	—	—	42
38	unskilled labour	38	82	37	2	—	—	—	1	160
39	others : unspecified	3	2	2	3	—	—	1	—	11
40	all occupations	132	135	140	68	30	8	12	14	539
41	percentage	24.5	25.0	26.0	12.6	5.6	1.5	2.2	2.6	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 6.12 : DISTRIBUTION OF THE GAINFULLY EMPLOYED BY THEIR PRINCIPAL OCCUPATION AND INCOME FROM BOTH PRINCIPAL AND SUBSIDIARY OCCUPATION FOR THE MONTH OF FEBRUARY 1954

sl. no.	principal occupation	income (Rs.)								
		0–25	26–50	51–75	76–100	101–125	126–150	151–200	201–	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	working earners									
1	superior administrative and executive	—	1	—	1	—	—	1	1	4
	superior technical—									
2	engineering	—	—	—	—	—	—	—	2	2
3	medical and health	1	—	1	1	—	—	1	1	5
4	teaching	—	—	4	2	8	1	—	—	15
5	all others	1	3	—	—	1	—	—	—	5
6	subordinate administrative and executive	—	2	32	9	3	1	3	3	53
7	ministerial work	—	—	1	9	9	2	3	2	26
8	subordinate technical	10	23	42	36	7	4	2	5	129
9	grass-cutting, fuel collection, gardening	10	2	3	1	—	—	—	—	16
10	rearers of animals for products	—	1	—	—	—	—	—	—	1
11	manufacturers of food & beverages	6	5	—	3	1	—	1	—	16
12	traders, brokers and agents	5	14	11	7	2	—	—	—	39
13	unskilled labour	22	75	44	3	—	—	—	1	145
14	others : unspecified	3	1	3	3	—	—	1	—	11
15	all occupations	58	127	141	75	31	8	12	15	467
16	percentage	12.4	27.2	30.2	16.1	6.6	1.7	2.6	3.2	100.0
	working earning dependents									
17	subordinate administrative and executive	1	—	—	—	—	—	—	—	1
18	subordinate technical work	21	1	—	—	—	—	—	—	22
19	grass-cutting, fuel collection, gardening	16	—	—	—	—	—	—	—	16
20	rearers of animals for products	11	1	—	—	—	—	—	—	12
21	manufacturers of food and beverages	3	—	—	—	—	—	—	—	3
22	traders, brokers and agents	3	—	—	—	—	—	—	—	3
23	unskilled labour	14	1	—	—	—	—	—	—	15
24	all occupations	69	3	—	—	—	—	—	—	72
25	percentage	95.8	4.2	—	—	—	—	—	—	100.0
	all working earners and earning dependents									
26	superior administrative and executive	—	1	—	1	—	—	1	1	4
	superior technical—									
27	engineering	—	—	—	—	—	—	—	2	2
28	medical and health	1	—	1	1	—	—	1	1	5
29	teaching	—	—	4	2	8	1	—	—	15
30	all others	1	3	—	—	1	—	—	—	5
31	subordinate administrative and executive	1	2	32	9	3	1	3	3	54
32	ministerial work	—	—	1	9	9	2	3	2	26
33	subordinate technical	31	24	42	36	7	4	2	5	151
34	grass-cutting, fuel collection, gardening	26	2	3	1	—	—	—	—	32
35	rearers of animals for products	11	2	—	—	—	—	—	—	13
36	manufacturers of food & beverages	9	5	—	3	1	—	1	—	19
37	traders, brokers and agents	8	14	11	7	2	—	—	—	42
38	unskilled labour	36	76	44	3	—	—	—	1	160
39	others : unspecified	3	1	3	3	—	—	1	—	11
40	all occupations	127	130	141	75	31	8	12	15	539
41	percentage	23.6	24.1	26.2	13.9	5.7	1.5	2.2	2.8	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.1: EARNING STRENGTH OF HOUSEHOLDS AND NATURE OF EMPLOYMENT OF THE PRINCIPAL EARNER

		households with earning strength																						
		1				**2**								**3**				**4**		all				
		one earner		one earner and one earning dependent		two earners		all classes		one earner and two earning dpndts.		two earners & one earning dependts.		three earners		all classes		two earners & two earning dependts.				all earners	all earning dependents	all earners and earning dependents
sl. no.	nature of employment of the principal earner	households	persons	households	persons	households	persons	households	persons	households	persons	households	persons	households	persons	households	persons	households	persons	households	persons			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
	stable																							
1	Development Board	82	327	10	43	21	128	31	171	2	12	4	36	2	23	8	71	—	—	121	569	138	1	139
2	private industries	31	122	4	17	9	68	13	85	—	—	1	11	2	12	3	23	—	—	47	230	55	1	56
3	other establishments	22	80	—	—	5	26	5	26	2	16	1	—	—	—	—	—	—	—	27	106	35	4	39
4	own account	47	212	10	62	3	24	13	86	—	—	—	6	3	30	6	52	—	—	66	350	80	17	97
5	outside Faridabad	9	41	1	8	3	15	4	23	—	—	—	—	—	—	—	—	—	—	13	64	15	1	16
6	total : stable employment	191	782	25	130	41	261	66	391	4	28	6	53	7	65	17	146	—	—	274	1319	323	24	347
	temporary																							
7	inside Faridabad	22	95	3	12	6	38	9	50	2	15	—	—	1	7	3	22	—	—	34	167	47	44	91
8	outside Faridabad	13	52	3	17	4	18	7	35	1	7	1	6	—	—	2	13	—	—	22	100	25	3	28
9	relief work	49	193	10	48	4	30	14	78	—	—	—	—	—	—	—	—	1	7	64	278	72	1	73
10	total : temporary employment	84	340	16	77	14	86	30	163	3	22	1	6	1	7	5	35	1	7	120	545	144	48	192
11	total : (stable & temporary)	275	1122	41	207	55	347	96	554	7	50	7	59	8	72	22	181	1	7	394	1864	467	72	539
	no work																							
12	cash dole	63	172	5	26	7	28	12	54	1	8	—	—	—	—	1	8	—	—	76	234	88	1	89
13	remittances	11	45	1	4	—	—	1	4	—	—	—	—	—	—	—	—	—	—	12	49	13	3	16
14	only earner unemployed	14	58	4	13	—	—	4	13	—	—	—	—	—	—	—	—	—	—	18	71	18	—	18
15	total : no work	88	275	10	43	7	28	17	71	1	8	—	—	—	—	1	8	—	—	106	354	119	4	123
16	all employments	363	1397	51	250	62	375	113	625	8	58	7	59	8	72	23	189	1	7	500	2218	586	76	662

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.2 : NATURE OF EMPLOYMENT OF PRINCIPAL AND OTHER EARNERS OF TWO AND THREE–EARNER HOUSEHOLDS

number of households

Columns under **nature of employment of earning dependent** — stable: (3) Development Board, (4) private industries, (5) other establishments, (6) own account, (7) outside Faridabad; temporary: (8) inside Faridabad, (9) outside Faridabad, (10) relief work; no work: (11) cash doles, (12) remittance; (13) total.

Columns under **nature of employment of 2nd earner** — stable: (14) Development Board, (15) private industries, (16) other establishments, (17) own account, (18) outside Faridabad; temporary: (19) inside Faridabad, (20) outside Faridabad, (21) relief work; no work: (22) cash dole, (23) remittance; (24) total.

1. h.h. with 1 earner, 1 e.d & 2. h.h. with 2 earners

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
1	Development Board (stable)	–	1	–	2	–	6	–	–	–	1	10	5	2	2	2	1	5	–	4	–	–	21
2	private industries (stable)	–	–	–	1	1	1	–	–	–	1	4	1	2	2	3	–	1	–	–	–	–	9
3	other establishments (stable)	–	–	–	–	–	–	–	–	–	–	–	–	–	3	1	–	–	–	–	1	–	5
4	own account (stable)	–	–	–	5	–	5	–	–	–	–	10	–	–	–	3	–	–	–	–	–	–	3
5	outside Faridabad (stable)	–	–	–	–	–	1	–	–	–	–	1	–	1	–	–	–	–	–	1	–	1	3
6	inside Faridabad (temporary)	–	–	–	–	–	3	–	–	–	–	3	–	–	–	1	–	3	–	1	1	–	6
7	outside Faridabad (temporary)	–	–	–	2	–	–	1	–	–	–	3	1	1	1	–	–	–	1	–	–	–	4
8	relief work (temporary)	–	–	1	–	–	9	–	–	–	–	10	–	1	–	1	–	–	–	2	–	–	4
9	cash dole (no work)	–	–	–	–	–	4	–	–	1	–	5	–	–	–	–	–	1	1	–	5	–	7
10	remittance (no work)	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
11	only earner unempl. (no work)	1	–	–	–	–	3	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–
12	all classes	1	1	1	10	1	33	1	–	1	2	51	7	7	8	11	1	10	2	8	7	1	62

3. h.h. with three earners/earning dependents

Left panel: *second earner/earning dependent* (columns as 3–13). Right panel: *third earner/earning dependent* (columns as 14–24).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
13	Development Board (stable)	4	–	1	1	–	1	–	–	1	–	8	2	–	1	1	–	3	1	–	–	–	8
14	private industries (stable)	1	–	–	–	1	1	–	–	–	–	3	1	–	–	–	–	2	–	–	–	–	3
15	other establishments (stable)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	own account (stable)	2	–	–	3	–	–	–	–	1	–	6	–	1	–	3	–	1	–	–	1	–	6
17	outside Faridabad (stable)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	inside Faridabad (temporary)	–	–	1	–	–	2	–	–	–	–	3	–	–	–	1	–	–	–	1	1	–	3
19	outside Faridabad (temporary)	–	–	–	–	–	1	1	–	–	–	2	–	–	–	1	–	1	–	–	–	–	2
20	relief work (temporary)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	cash dole (no work)	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	1	–	–	–	–	1
22	remittances (no work)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	only earner unempl. (no work)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	all classes	7	–	2	4	1	5	1	–	2	1	23	3	1	1	6	–	8	1	1	2	–	23

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.3 : NATURE AND INTENSITY OF EMPLOYMENT OF EARNERS AND EARNING DEPENDENTS DURING 90 DAYS, DECEMBER 1953—FEBRUARY 1954

work days in 90 days period			90–84	83–71	70–58	57–45	44–33	32–20	19–07	06–00	
average work days per week			6.75	6	5	4	3	2	1	0.25	
sl. no.	nature of employment of principal earner	number of		earners and earning dependents								all
		house-holds	per-sons	range of intensity of employment								
				1.00-0.93	0.92-0.79	0.78-0.64	0.63-0.50	0.49-0.37	0.36-0.22	0.21-0.08	0.07-0.00	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Faridabad Development Board											
1	administration	26	130	28	1	–	–	–	–	–	–	29
2	health and education	31	149	35	1	–	–	–	–	1	–	37
3	power house	23	116	24	1	–	–	–	1	–	–	26
4	technical institute & factories	25	96	19	4	4	3	–	1	–	–	31
5	others : unskilled labour	16	78	3	11	2	–	–	–	–	–	16
6	total : Development Board	121	569	109	18	6	3	–	2	1	–	139
7	private industries	47	230	34	3	12	4	1	1	1	–	56
8	other establishments and individuals	27	106	29	2	6	1	1	–	–	–	39
9	own account : trade	34	179	30	6	3	1	–	–	–	3	43
10	own account : artisans	14	78	15	3	2	2	–	1	–	–	23
11	own account : others	18	93	18	4	1	4	1	–	1	2	31
12	total : own account	66	350	63	13	6	7	1	1	1	5	97
13	total : stable employment inside Faridabad	261	255	235	36	30	15	3	4	3	5	331
14	stable employment outside Faridabad	13	64	10	4	2	–	–	–	–	–	16
15	total : stable employment	274	1319	245	40	32	15	3	4	3	5	347
	temporary employment											
16	relief work in Faridabad	64	278	22	23	15	9	1	3	–	–	73
17	trade	6	23	4	2	1	2	–	1	–	–	10
18	unskilled labour	16	81	2	3	3	6	3	7	4	1	29
19	others	12	63	11	4	6	8	4	10	9	–	52
20	total : temp. inside Faridabad	98	445	39	32	25	25	8	21	13	1	164
21	total : temp. outside Faridabad	22	100	3	2	9	8	–	2	3	1	28
22	total : temporary employment	120	545	42	34	34	33	8	23	16	2	192
23	total : stable and temporary employment	394	1864	287	74	66	48	11	27	19	7	539
24	cash doles	76	234	–	–	–	–	–	–	–	89	89
25	remittances	12	49	–	–	–	–	–	1	–	15	16
26	only earner unemployed	18	71	–	–	1	–	–	2	1	14	18
27	total (24+25+26)	106	354	–	–	1	–	–	3	1	118	123
28	all classes	500	2218	287	74	67	48	11	30	20	125	662

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.4 : AVERAGE INCOME IN RUPEES PER MONTH BY NATURE AND INTENSITY OF EMPLOYMENT OF EARNERS AND EARNING DEPENDENTS DURING THREE MONTHS, DECEMBER 1953—FEBRUARY 1954

	work days in 90 days period			90–84	83–71	70–58	57–45	44–33	32–20	19–07	06–00	
	average work-days per week			6.75	6	5	4	3	2	1	0.25	
sl. no.	nature of employment of principal earner	number of		average income in rupees per month								
		house-holds	earners and earning depts.	range of intensity of employment								all
				1.00-0.93	0.92-0.79	0.78-0.64	0.63-0.50	0.49-0.37	0.36-0.22	0.21-0.08	0.07-0.00	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Faridabad Development Board											
1	administration	26	29	139	150	–	–	–	–	–	–	140
2	health & education	31	37	97	101	–	–	–	–	25	–	94
3	power house	23	26	104	66	–	–	–	18	–	–	100
4	technical institute & factories	25	31	122	35	35	37	–	13	–	–	88
5	others : unskilled labour	16	16	59	56	46	–	–	–	–	–	55
6	total : Development Board	121	139	60	39	39	37	–	16	25	–	99
7	private industries	47	56	127	68	77	46	39	22	4	–	102
8	other establishments and individuals	27	39	77	50	51	30	63	–	–	–	70
9	own account : trade	34	43	63	44	38	35	–	–	–	00	53
10	own account : artisans	14	23	35	50	61	56	–	6	–	–	39
11	own account : others	18	31	48	111	40	20	12	–	00	00	47
12	total : own account	66	97	52	66	46	33	12	6	00	00	48
13	total : stable employment inside Faridabad	261	331	94	62	58	37	38	15	10	00	81
14	stable employment outside Faridabad	13	16	120	77	111	–	–	–	–	–	107
15	total : stable employment	274	347	95	63	62	37	38	15	10	00	82
	temporary employment											
16	relief work in Faridabad	64	73	54	48	37	28	18	15	–	–	43
17	trade	6	10	20	38	26	18	–	7	–	–	23
18	unskilled labour	16	29	60	30	42	24	25	10	7	1	23
19	others	12	52	11	34	20	7	7	5	5	–	11
20	total : temp. inside Faridabad	98	164	39	44	35	19	15	8	5	1	28
21	total : temp. outside Faridabad	22	28	61	45	40	31	–	16	5	00	33
22	total : temporary. employment	120	192	40	44	35	22	15	9	5	1	29
23	total : stable and temporary employment	394	539	87	55	48	27	21	10	6	00	63
24	cash doles	76	89	–	–	–	–	–	–	–	41	41
25	remittances	12	16	–	–	–	–	–	59	–	49	50
26	only earner unemployed	18	18	–	–	53	–	–	14	6	2	6
27	total (24+25+26)	106	123	–	–	53	–	–	29	6	37	37
28	all classes	500	662	87	55	48	27	21	12	6	35	58

no. of households surveyed : 500   total no. of households : 5374

169

22

TABLE 7.5 : PERCENTAGE OF WORKING EARNERS AND EARNING DEPENDENTS AND THOSE SEEKING EMPLOYMENT BY NATURE OF EMPLOYMENT, WORKDAYS PER WEEK AND AVERAGE MONTHLY INCOME DURING DECEMBER 1953–FEBRUARY 1954

sl. no.	work days per week		earners and earning dependents			aver. income per mth.(Rs.)	earners and earning dependents			aver. income per mth.(Rs.)	earners and earning dependents			aver. income per mth.(Rs.)
	range	average	no.	percentage	cum. percent		no.	percentage	cum. percent		no.	percentage	cum. percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	administration, D.B.						**health & edcn. D.B.**				**Power house, Dev.Board**			
1	6½—7	6.75	28	96.5	96.5	139	35	94.6	94.6	97	24	92.3	92.3	104
2	5½—6½	6	1	3.5	100.0	150	1	2.7	97.3	101	1	3.9	96.2	66
3	4½—5½	5	—	—	—	—	—	—	97.3	—	—	—	96.2	—
4	3½—4½	4	—	—	—	—	—	—	97.3	—	—	—	96.2	—
5	2½—3½	3	—	—	—	—	—	—	97.3	—	—	—	96.2	—
6	1½—2½	2	—	—	—	—	—	—	97.3	—	—	—	96.2	—
7	½—1½	1	—	—	—	—	—	—	97.3	—	1	3.8	100.0	18
8	0 —½	0.25	—	—	—	—	1	2.7	100.0	25	—	—	—	—
9	all		29	(4.9)	—	140	37	(6.3)	—	94	26	(4.4)	—	100
	tech. inst & fact. D.B.						**others: unskilled work**				**total: Dev. Board**			
10	6½—7	6.75	19	61.3	61.3	122	3	18.7	18.7	59	109	78.4	78.4	113
11	5½—6½	6	4	12.9	74.2	35	11	68.8	87.5	56	18	13.0	91.4	60
12	4½—5½	5	4	12.9	87.1	35	2	12.5	100.0	46	6	4.3	95.7	39
13	3½—4½	4	3	9.7	96.8	37	—	—	—	—	3	2.2	97.9	37
14	2½—3½	3	—	—	96.8	—	—	—	—	—	—	—	97.9	—
15	1½—2½	2	1	3.2	100.0	13	—	—	—	—	—	—	97.9	—
16	½—1½	1	—	—	—	—	—	—	—	—	2	1.4	99.3	16
17	0 —½	0.25	—	—	—	—	—	—	—	—	1	0.7	100.0	25
18	all		31	(5.3)	—	88	16	(2.7)	—	55	139	(23.6)	—	99
	privates industries						**other establish & h.hs.**				**own account: trade**			
19	6½—7	6.75	34	60.7	60.7	127	29	74.3	74.3	77	30	69.8	69.8	63
20	5½—6½	6	3	5.4	66.1	68	2	5.1	79.4	50	6	13.9	83.7	44
21	4½—5½	5	12	21.4	87.5	77	6	15.4	94.8	51	3	7.0	90.7	38
22	3½—4½	4	4	7.1	94.6	46	1	2.6	97.4	30	1	1.3	93.0	35
23	2½—3½	3	1	1.8	96.4	39	1	2.6	100.0	63	—	—	93.0	—
24	1½—2½	2	1	1.8	98.2	22	—	—	—	—	—	—	93.0	—
25	½—1½	1	1	1.8	100.0	4	—	—	—	—	—	—	93.0	—
26	0 —½	0.25	—	—	—	—	—	—	—	—	3	7.0	100.0	00
27	all		56	(9.5)	—	102	39	(6.6)	—	70	43	(7.3)	—	53
	own account: artisans						**own account: other**				**total: own account**			
28	6½—7	6.75	15	65.2	65.2	35	18	58.1	58.1	48	63	65.0	65.0	52
29	5½—6½	6	3	13.0	78.2	50	4	12.9	71.0	111	13	13.4	78.4	66
30	4½—5½	5	2	8.7	86.9	61	1	3.2	74.2	40	6	6.2	84.6	46
31	3½—4½	4	2	8.7	95.6	56	4	12.9	87.1	20	7	7.2	91.8	33
32	2½—3½	3	—	—	95.6	—	1	3.2	90.3	12	1	1.0	92.8	12
33	1½—2½	2	1	4.4	100.0	6	—	—	90.3	—	1	1.0	93.8	6
34	½—1½	1	—	—	—	—	1	3.2	93.5	00	1	1.0	94.8	00
35	0 —½	0.25	—	—	—	—	2	6.5	100.0	00	5	5.2	100.0	00
36	all		23	(3.9)	—	39	31	(5.3)	—	47	97	(16.5)	—	48

note :   bracketted figures represent percentage of total labour force.

TABLE 7.5 (*Contd.*) : PERCENTAGE OF WORKING EARNERS AND EARNING DEPENDENTS AND THOSE SEEKING EMPLOYMENT BY NATURE OF EMPLOYMENT, WORKDAYS PER WEEK AND AVERAGE MONTHLY INCOME DURING DECEMBER 1953—FEBRUARY 1954

srl. no.	work days per week		earners and earning dependents			aver. income per month (Rs)	earners and earning dependents			aver. income per month (Rs)	earners and earning dependents			aver. income per month (Rs)
	range	average	no.	per-cent-age	cum. per-cent		no.	per-cent-age	cum. per-cent		no.	per-cent-age	cum. per-cent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			stable empl. inside Fbd.				stable empl. outside Fbd.				total: stable empl.			
37	6½—7	6.75	235	71.0	71.0	94	10	62.5	62.5	120	245	70.6	70.6	95
38	5½—6½	6	36	10.9	81.9	62	4	25.0	87.5	77	40	11.5	82.1	63
39	4½—5½	5	30	9.1	91.0	58	2	12.5	100.0	111	32	9.2	91.3	62
40	3½—4½	4	15	4.5	95.5	37	—	—	—	—	15	4.3	95.6	37
41	2½—3½	3	3	0.9	96.4	38	—	—	—	—	3	0.9	96.5	38
42	1½—2½	2	4	1.2	97.6	15	—	—	—	—	4	1.2	97.7	15
43	½—1½	1	3	0.9	98.5	10	—	—	—	—	3	0.9	98.6	10
44	0 — ½	0.25	5	1.5	100.0	00	—	—	—	—	5	1.4	100.0	00
45	all		331	(56.2)	—	81	16	(2.7)	—	107	347	(58.9)	—	82
			relief work in Faridabad				temporary empl: trade				tempy: unskilled labour			
46	6½—7	6.75	22	30.1	30.1	54	4	40.0	40.0	20	2	6.9	6.9	60
47	5½—6½	6	23	31.5	61.6	48	2	20.0	60.0	38	3	10.4	17.3	30
48	4½—5½	5	15	20.6	82.2	37	1	10.0	70.0	26	3	10.4	27.7	42
49	3½—4½	4	9	12.3	94.5	26	2	20.0	90.0	18	6	20.7	48.4	24
50	2½—3½	3	1	1.4	95.9	18	—	—	90.0	—	3	10.3	58.7	25
51	1½—2½	2	3	4.1	100.0	15	1	10.0	100.0	7	7	24.1	82.8	10
52	½—1½	1	—	—	—	—	—	—	—	—	4	13.8	96.6	7
53	0 — ½	0.25	—	—	—	—	—	—	—	—	1	3.4	100.0	1
54	all		73	(12.4)	—	43	10	(1.7)	—	23	29	(4.9)	—	23
			temporary empl: others				tempy. empl. inside Fbd.				tempy. empl. outside Fbd.			
55	6½—7	6.75	11	21.2	21.2	11	39	23.8	23.8	39	3	10.7	10.7	61
56	5½—6½	6	4	7.7	28.9	34	32	19.5	43.3	44	2	7.1	17.8	45
57	4½—5½	5	6	11.5	40.4	20	25	15.3	58.6	35	9	32.2	50.0	40
58	3½—4½	4	8	15.4	55.8	7	25	15.2	73.8	19	8	28.6	78.6	31
59	2½—3½	3	4	7.7	63.5	7	8	4.9	78.7	15	—	—	78.6	—
60	1½—2½	2	10	19.2	82.7	5	21	12.8	91.5	8	2	7.1	85.7	16
61	½—1½	1	9	17.3	100.0	5	13	7.9	99.4	5	3	10.7	96.4	5
62	0 — ½	0.25	—	—	—	—	1	0.6	100.0	1	1	3.6	100.0	00
63	all		52	(8.8)	—	11	164	(27.8)	—	28	28	(4.8)	—	33
			total: tempy. empl.				unemployed seeking empl.				total: in labour force			
64	6½—7	6.75	42	21.9	21.9	40	1	2.0	2.0	25	288	48.9	48.9	87
65	5½—6½	6	34	17.7	39.6	44	—	—	2.0	—	74	12.6	61.5	55
66	4½—5½	5	34	17.7	57.3	35	2	4.0	6.0	47	68	11.5	73.0	48
67	3½—4½	4	33	17.2	74.5	22	—	—	6.0	—	48	8.1	81.1	27
68	2½—3½	3	8	4.2	78.7	15	—	—	6.0	—	11	1.9	83.0	21
69	1½—2½	2	23	12.0	90.7	9	3	6.0	12.0	9	30	5.1	88.1	10
70	½—1½	1	16	8.3	99.0	5	1	2.0	14.0	12	20	3.4	91.5	6
71	0 — ½	0.25	2	1.0	100.0	1	43	86.0	100.0	0	50	8.5	100.0	00
72	all		192	(32.6)	—	29	50	(8.5)	—	3	589	(100.0)	—	58

note: bracketted figures represent percentage of total labour force.

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.6 : NATURE AND DURATION OF EMPLOYMENT OF EARNERS AND EARNING DEPENDENTS

		earners and earning dependents											
		no. with duration of present employment						cumulative percentages for duration of employment					
serial no.	nature of employment of the principal earner	less than 3 months	3 mths.—6 mths.	6 mths.—1 year	1 year—2 years	2 years—3 years	3 years—6 years	less than 3 months	less than 6 months	less than 1 year	less than 2 years	less than 3 years	less than 6 years
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Faridabad Dev. Board—												
1	administration	–	–	2	6	8	12	–	–	7.1	28.6	57.1	100.0
2	health and education	1	–	4	5	8	19	2.7	2.7	13.5	27.0	48.6	100.0
3	power house	1	1	2	4	5	13	3.8	7.7	15.4	30.8	50.0	100.0
4	tech. inst. & factories	1	3	4	11	11	2	3.1	12.5	25.0	59.4	93.7	100.0
5	others : unskilled labour	–	–	–	–	1	15	–	–	–	–	6.3	100.0
6	total : Development Board	3	4	12	26	33	61	2.2	5.0	13.7	32.6	56.1	100.0
7	private industries	5	6	2	19	23	1	8.9	19.6	23.2	57.1	98.2	100.0
8	other establishments and households	6	11	6	4	6	6	15.4	43.6	59.0	69.2	84.6	100.0
9	own account : trade	–	–	4	16	10	13	–	–	9.3	46.5	69.8	100.0
10	own account : artisans	2	–	2	3	6	10	8.7	8.7	17.4	30.4	56.5	100.0
11	own account : others	–	3	1	9	7	11	–	9.7	12.9	41.9	64.5	100.0
12	total : own account	2	3	7	28	23	34	2.1	5.2	12.4	41.2	64.9	100.0
13	total : stable employment inside Faridabad	16	24	27	77	85	102	4.8	12.1	20.2	43.5	69.2	100.0
14	stable employment outside Faridabad	–	1	2	4	4	5	–	6.3	18.8	43.8	68.8	100.0
15	total : stable employment	16	25	29	81	89	107	4.6	11.8	20.2	43.5	69.2	100.0
	temporary employment												
16	relief work in Faridabad	10	15	17	8	6	17	13.7	34.2	57.5	68.5	76.7	100.0
17	trade	1	3	3	3	–	–	10.0	40.0	70.0	100.0	100.0	100.0
18	unskilled labour	3	6	4	5	4	7	10.3	31.0	44.8	62.1	75.9	100.0
19	others	9	7	6	11	6	13	17.3	30.8	42.3	63.5	75.0	100.0
20	total : temporary inside Faridabad	23	31	30	27	16	37	14.0	32.9	51.2	67.7	77.4	100.0
21	total : temporary outside Faridabad	4	2	2	5	6	9	14.3	21.4	28.6	46.4	67.9	100.0
22	total : temporary employment	27	33	32	32	22	46	14.1	31.2	47.9	64.6	76.0	100.0
23	total : stable and temporary employment	43	58	61	113	111	153	8.0	18.7	30.0	51.0	71.6	100.0
24	cash doles	–	1	6	8	6	68	–	1.1	7.9	16.9	23.6	100.0
25	remittances	1	1	–	3	3	8	6.3	12.5	12.5	31.3	50.0	100.0
26	only earner unemployed	5	3	4	4	1	1	27.8	44.0	66.7	88.9	94.4	100.0
27	total : (24+25+26)	6	5	10	15	10	77	4.9	8.9	17.1	29.3	37.4	100.0
28	all classes	49	63	71	128	121	230	7.4	16.9	27.6	47.0	65.3	100.0

no. of households surveyed : 500   total no. of households : 5374

TABLE 7.7 : NATURE AND INTENSITY OF EMPLOYMENT AND AVERAGE MONTHLY INCOME THEREFROM OF WOMEN EARNERS AND EARNING DEPENDENTS DURING DECEMBER 1953—FEBRUARY 1954.

sl. no.	occupation	earners								earning dependents								all							
													intensity of employment												
		1.0-0.8		0.8-0.5		0.5-0.0		all		1.0-0.8		0.8-0.5		0.5-0.0		all		1.0-0.8		0.8-0.5		0.5-0.0		all	
		no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.	no.	av. Rs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
1	doctor	1	507	—	—	—	—	1	507	—	—	—	—	—	—	—	—	1	507	—	—	—	—	1	507
2	nurse	1	180	—	—	—	—	1	180	—	—	—	—	—	—	—	—	1	180	—	—	—	—	1	180
3	teacher	6	76	—	—	—	—	6	76	—	—	—	—	—	—	—	—	6	76	—	—	—	—	6	76
4	tailor	—	—	—	—	—	—	—	—	—	—	2	8	7	5	9	5	—	—	2	8	7	5	9	5
5	basket maker	—	—	—	—	—	—	—	—	—	—	4	2	1	3	5	2	—	—	4	2	1	3	5	2
6	spinning	—	—	—	—	—	—	—	—	—	—	1	1	1	1	2	1	—	—	1	1	1	1	2	1
7	hawker	—	—	—	—	—	—	—	—	—	—	1	7	—	—	1	7	—	—	1	7	—	—	1	7
8	dung cake and fuelwood collection	—	—	1	10	—	—	1	10	3	5	2	5	7	6	12	6	3	5	3	7	7	6	13	6
9	labourer	1	60	1	24	2	6	4	24	1	12	—	—	1	19	2	16	2	36	1	24	3	10	6	21
10	domestic servant	3	15	—	—	1	1	4	9	3	9	1	2	—	—	4	7	6	12	1	2	1	1	8	8
11	sweeper	2	65	—	—	—	—	2	65	—	—	—	—	—	—	—	—	2	65	—	—	—	—	2	65
12	animal husbandry	1	12	—	—	—	—	1	12	8	14	1	1	2	1	11	11	9	14	1	1	2	1	12	11
13	total : working	15	92	2	17	3	4	20	72	15	10	12	4	19	5	46	8	30	51	14	6	22	5	66	26
14	living on doles etc.	—	—	—	—	—	—	82	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	82	40
15	all	15	92	2	17	3	4	102	46	15	10	12	4	19	5	46	8	30	51	14	6	22	5	148	34

TABLE 7.8 : DISTRIBUTION OF THE LABOUR FORCE BY NATURE OF EMPLOYMENT AND EDUCATIONAL AND TECHNICAL QUALIFICATION

educational qualification — technical experience

serial no.	nature of principal employment	illiterate				primary, but not middle				middle, but not matric				matriculates and above					all				
		no skill	merely practical skill	skill; lower order certificate	all	no skill	merely practical skill	skill; lower order certificate	all	no skill	merely practical skill	skill; lower order certificate	all	no skill	merely practical skill	skill; lower order certificate	skill; tech. degree or diploma	all	no skill	merely practical skill	skill; lower order certificate	skill; tech. degree or diploma	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
1	Development Board Faridabad	5	2	-	7	41	24	10	75	9	8	13	30	6	6	7	8	27	61	40	30	8	139
2	private industries and other establishments in Faridabad	-	-	-	-	3	3	-	6	-	2	-	2	3	2	2	1	8	6	7	2	1	16
3	own account in Faridabad	10	3	-	13	17	19	3	39	10	13	4	27	5	6	4	1	16	42	41	11	1	95
4	service and own account outside Faridabad	11	7	1	19	36	19	5	60	7	3	2	12	4	-	-	2	6	58	29	8	2	97
5	sub-total : stable employment(1-4)	26	12	1	39	97	65	18	180	26	26	19	71	18	14	13	12	57	167	117	51	12	347
6	per cent	7	3	1	11	28	19	5	52	7	7	6	20	6	4	4	3	17	48	33	16	3	100
7	temporary employment	50	10	2	62	81	27	6	114	6	3	2	11	-	2	3	-	5	137	42	13	-	192
8	per cent	26	5	1	32	42	14	3	59	3	2	1	6	-	1	2	-	3	71	22	7	-	100
9	all employed	76	22	3	101	178	92	24	294	32	29	21	82	18	16	16	12	62	304	159	64	12	539
10	per cent	14	4	1	19	33	17	5	55	6	5	4	15	3	3	3	2	11	56	29	13	2	100
11	only earner unemployed	2	1	-	3	8	3	-	11	-	1	-	1	3	-	-	-	3	13	5	-	-	18
12	dependents seeking employment	4	1	-	5	10	4	3	17	4	-	3	7	1	1	1	-	3	19	6	7	-	32
13	sub-total : unemployed (11+12)	6	2	-	8	18	7	3	28	4	1	3	8	4	1	1	-	6	32	11	7	-	50
14	per cent	12	4	-	16	36	14	6	56	8	2	6	16	8	2	2	-	12	64	22	14	-	100
15	all labour force (9+13)	82	24	3	109	196	99	27	322	36	30	24	90	22	17	17	12	68	336	170	71	12	589
16	per cent	14	4	1	18	33	17	5	55	6	5	4	15	4	3	3	2	12	57	29	12	2	100

no. of households surveyed : 500   total no. of households : 5374

TABLE 8.1 : AGE, EDUCATIONAL QUALIFICATION AND PREVIOUS OCCUPATION OF THE UNEMPLOYED SEEKING EMPLOYMENT

Column legend (age group / educational qualification):

- 15–19: (3) illiterate, (4) literate but not middle, (5) middle, but not matric
- 20–24: (6) illiterate, (7) literate, but not middle, (8) middle, but not matric, (9) matriculate
- 25–29: (10) illiterate, (11) literate, but not middle, (12) matriculat
- 30–39: (13) literate, but not middle, (14) middle, but not matric
- 40–49: (15) illiterate, (16) literate, but not middle
- 50–59: (17) illiterate, (18) literate, but not middle, (19) matric or above
- 60+: (20) literate, but not middle, (21) graduate
- all: (22) illiterate, (23) literate, but not middle, (24) middle, but not matric, (25) matric and above, (26) total

(1)	(2) occupation before losing job	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
1	assistant teacher	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1
2	tuition	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	1
3	sub-total : superior technical	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	2	2
4	assistant manager	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	1
5	watchman	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	1
6	sweeper	–	–	–	–	–	–	–	1	–	–	–	–	1*	–	–	1	–	–	–	2	1	–	–	3
7	sub-total : sub : admn. & executive	–	–	–	–	–	–	–	1	–	–	–	–	1	1	1	1	–	–	–	3	2	–	–	5
8	clerk	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
9	munshi	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	1
10	storekeeper	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
11	sub-total : ministerial	–	–	–	–	1	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	1	–	3
12	carpenter	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2
13	cleaner	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	2
14	cutter	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	1
15	dai nurse	–	–	–	–	1*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
16	electrician	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
17	factory helper	–	–	–	–	–	–	–	–	–	–	1	1	1	1	–	–	–	–	–	–	3	1	–	4
18	motor driver	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
19	painter	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1
20	sockmaker	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
21	tailor	–	–	–	–	–	–	–	–	2*	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2
22	turner	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
23	sub-total : subordinate technical	1	3	1	1	4	1	–	–	3	–	1	1	–	1	–	–	–	–	–	2	12	3	–	17
24	trader	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
25	agricultural labour	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	1
26	casual labour	–	–	–	1	–	–	1	–	–	–	–	–	–	1	–	1	–	1	–	–	3	–	1	4
27	herdsman	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	1	–	–	1
28	mason's assistant	–	–	–	1	–	–	–	–	–	1	–	–	–	–	2	–	–	–	–	–	4	–	–	4
29	stone collection	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	2
30	sub-total : unskilled labour	–	–	–	–	2	1	–	–	1	1	1	–	1	1	–	3	–	1	–	1	9	1	1	12
31	student	–	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2	–	4
32	job not known	1	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	1	–	1	3
33	living on dole or remittance	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	1	1	–	–	2
34	beggar	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	1
35	sub-total : no job	1	3	2	–	–	–	–	1	–	1	1	–	–	–	–	–	–	–	–	1	2	4	2	10
36	all	2	6	3	1	6	3	1	2	5	3	3	2	2	3	1	4	1	1	1	8	28	8	6	50

note :—3 women unemployed shown with(*)

no. of households surveyed : 500   total no. of households : 5374

TABLE 8.2 : DISTRIBUTION OF THE UNEMPLOYED BY THEIR LAST OCCUPATION AND MONTHLY INCOME THEREFROM

sl. no.	last occupation	average income per month (in Rs.) from last occupation						all income groups
		0–10	11–25	26–50	51–75	76–100	101–150	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	assistant teacher	—	—	—	—	—	1	1
2	tuition	—	—	1	—	—	—	1
3	sub-total : superior technical	—	—	1	—	—	1	2
4	assistant manager	—	—	—	—	—	1	1
5	watchman	—	—	—	1	—	—	1
6	sweeper	—	—	3*	—	—	—	3
7	sub-total : sub. admn. & execu.	—	—	3	1	—	1	5
8	clerk	—	—	1	—	—	—	1
9	munshi	—	—	—	1	—	—	1
10	storekeeper	—	—	—	—	1	—	1
11	sub-total : subordinate ministerial	—	—	1	1	1	—	3
12	carpenter	2	—	—	—	—	—	2
13	cleaner	—	—	1	1	—	—	2
14	cutter	—	—	—	1	—	—	1
15	dai nurse	—	—	—	1*	—	—	1
16	electrician	—	—	1	—	—	—	1
17	factory helper	—	1	1	1	1	—	4
18	motor driver	—	—	—	1	—	—	1
19	painter	—	—	1	—	—	—	1
20	sockmaker	—	1	—	—	—	—	1
21	tailor	1*	1	—	—	—	—	2
22	turner	—	—	—	—	1	—	1
23	sub-total : subordinate technical	3	3	4	5	2	—	17
24	trader	—	—	1	—	—	—	1
25	agricultural labour	—	—	—	1	—	—	1
26	casual labour	—	—	2	2	—	—	4
27	herdsman	—	—	1	—	—	—	1
28	mason's assistant	—	—	2	1	—	—	3
29	stone collection	—	—	—	3	—	—	3
30	sub-total : unskilled labour	—	—	5	7	—	—	12
31	all occupations	3	3	15	14	3	2	40

note : 1. 3 unemployed women shown with (*).

2. out of a total of 50 unemployed in the sample, 4 were students, 2 were living on doles or remittances, 1 was a beggar, 2 had no previous occupation, and for 1 information was not available regarding past occupation.

TABLE 8.3 : DISTRIBUTION OF THE UNEMPLOYED BY INCOME FROM OCCUPATION (FOR FEBRUARY 1954) OF HOUSEHOLDS TO WHICH THEY BELONG

sl. no.	income level Rs. p.m.	persons	percentage
(1)	(2)	(3)	(4)
1	0— 25	23	46
2	26— 50	4	8
3	51— 75	6	12
4	76—100	7	14
5	101—125	3	6
6	126—150	4	8
7	151—200	2	4
8	201—	1	2
9	all levels	50	100

TABLE 8.4 : DISTRIBUTION OF HOUSE-HOLDS WITH AT LEAST ONE MEMBER UNEMPLOY-ED BY THE NUMBER OF UNEMPLOYED MEMBERS AND THE NUMBER OF EARNERS IN THE HOUSE-HOLD

sl. no.	no. of un-employed in the household	no. of household having working earners—			
		nil	one	two	all
(1)	(2)	(3)	(4)	(5)	(6)
1	one	15	19	5	39
2	two	3	1	—	4
3	three	—	—	1	1
4	all	18	20	6	44

TABLE 8.5 : PERCENTAGE DISTRIBU-TION OF HOUSEHOLDS WITH AT LEAST ONE MEMBER UNEMPLOYED BY THE NUMBER OF UNEM-PLOYED MEMBERS AND THE NUMBER OF EARNERS IN THE HOUSEHOLDS

sl. no.	no. of un-employed in the household	no. of household having working earners—			
		nil	one	two	all
(1)	(2)	(3)	(4)	(5)	(6)
1	one	34.1	43.2	11.3	88.6
2	two	6.8	2.3	—	9.1
3	three	—	—	2.3	2.3
4	all	40.9	45.5	13.6	100.0

TABLE 8.6 : DISTRIBUTION OF HOUSEHOLDS WITH AT LEAST ONE EARNER UNEMPLOYED BY THE NUMBER OF MEMBERS UNEMPLOYED AND THE EXPENDITURE LEVEL OF THE HOUSEHOLD

sl. no.	number of un-employed members in the households	expenditure level of the household							
		26–50	51–75	76–100	101–125	126–150	151–200	201–	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	one	8	7	10	5	3	2	4	39
2	two	1	—	—	1	—	—	2	4
3	three	—	—	1	—	—	—	—	1
4	all classes	9	7	11	6	3	2	6	44

no. of households surveyed : 500   total no. of households : 5374

TABLE 9.1 : NUMBER AND PERCENTAGES OF HOUSEHOLDS BY NATURE OF EMPLOY-
MENT OF THE PRINCIPAL EARNER AND BY LEVELS OF CONSUMER EXPEN-
DITURE OF HOUSEHOLDS

sl. no.	nature of employ-ment of principal earner	households in expenditure level (rupees per month)					per-cent-age all levels	percentages in different expenditure levels				
		upto 50	51–100	101–150	151 & above	all levels	all levels	upto 50	51–100	101–150	151 & above	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Development Board, Faridabad	3	46	39	33	121	24.2	2.5	38.0	32.2	27.3	100.0
2	private industries	3	17	13	14	47	9.4	6.4	36.2	27.6	29.8	100.0
3	other establishments and individuals	3	9	8	7	27	5.4	11.1	33.3	29.6	26.0	100.0
4	own account	6	33	20	7	66	13.2	9.1	50.0	30.3	10.6	100.0
5	outside Faridabad	—	4	4	5	13	2.6	—	30.8	30.8	38.4	100.0
6	total: stable employment	15	109	84	66	274	54.8	5.5	39.8	30.6	24.1	100.0
7	in Faridabad	10	11	8	5	34	6.8	29.4	32.4	23.5	14.7	100.0
8	outside Faridabad	3	14	2	3	22	4.4	13.6	63.7	9.1	13.6	100.0
9	relief work	9	39	12	4	64	12.8	14.1	60.9	18.8	6.2	100.0
10	total : temporary empl.	22	64	22	12	120	24.0	18.3	53.4	18.3	10.0	100.0
11	total : stable and temporary empl.	37	173	106	78	394	78.8	9.4	43.9	26.9	19.8	100.0
12	cash doles	32	27	12	5	76	15.2	42.1	35.5	15.8	6.6	100.0
13	remittances	2	9	1	—	12	2.4	16.7	75.0	8.3	—	100.0
14	only earner un-employed	7	9	1	1	18	3.6	38.8	50.0	5.6	5.6	100.0
15	total : no work	41	45	14	6	106	21.2	38.7	42.4	13.2	5.7	100.0
16	all employments	78	218	120	84	500	100.0	15.6	43.6	24.0	16.8	100.0

Note: Row groups labelled (vertically) as "stable employment" (rows 1–5), "temp. employment" (rows 7–9), and "no work" (rows 12–14).

no. of households surveyed : 500   total no. of households : 5374

TABLE 9.2 : PER HOUSEHOLD CONSUMER EXPENDITURE PER MONTH IN RUPEES FOR DIFFERENT LEVELS OF HOUSEHOLD EXPENDITURE

(reference period : February 1954)

sl. no.	items of consumption	per household consumption in rupees per month for different items at levels of household expenditure								
		8-25	26-50	51-75	76-100	101-125	126-150	151-200	201-	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	all cereals	7.40	14.09	22.75	28.05	28.92	31.42	38.72	42.30	26.89
2	pulses and products	0.85	1.36	2.15	2.96	2 75	3.58	4.23	5.84	2.85
3	milk and products	2.00	3.85	6.46	10.01	14.01	17.27	20.73	34.41	12.15
4	vegetables	1.06	2.00	3.11	3.79	4.46	6.25	6.75	13.80	4.63
5	fruits and nuts	0.08	0.19	0.60	0.66	1.52	2.68	3.79	7.66	1.67
6	meat, fish and eggs	—	0.12	0.45	0.93	0.84	1.91	2.70	5.38	1.24
7	oils and products	2.09	3.41	5.11	6.22	7.53	8.71	9.82	13.10	6.73
8	sugar and gur	1.62	2.39	4.00	5.56	5.69	7.25	8.78	11.59	5.58
9	salt and spices	0.61	0.84	1.39	1.92	2.02	2.12	2.80	4.11	1.89
10	beverages & refreshments	0.61	1.06	1.51	2.50	3.15	3.22	4.45	8.96	2.83
11	total : food items	16.32	29.31	47.53	62.60	70.89	84.41	102.77	147.15	66.46
12	tobacco & products, *pan* etc.	0.15	0.71	1.01	1.55,	2.05	1.85	3.16	6.35	1.87
13	drugs and intoxicants	—	0.21	0.04	0.18	0.34	0.62	0.59	2.82	0.43
14	fuel and light	2.10	3.54	5.25	6.16	7.23	8.06	9.58	13.88	6.69
15	clothing & foot-wear	0.44	2.07	3.18	6.52	12.36	18.21	20.34	39.82	10.59
16	bedding etc.	—	0.09	—	0.27	1.07	1.87	0.70	1.67	0.58
17	furniture & equipments	—	0.05	0.07	0.36	0.32	1.04	2.48	2.56	0.66
18	utensils	—	0.13	0.14	0.20	0.76	1.30	1.28	1.68	0.56
19	ornaments	—	—	—	—	—	0.47	0.64	—	0.11
20	amusements & sports	—	0.08	0.06	0.08	0.18	0.29	0.95	3.20	0.41
21	books and education	0.03	0.31	0.61	0.63	2.17	2.30	3.36	8.91	1.78
22	medicines	0.27	0.31	0.72	1.53	1.06	2.01	5.66	7.92	1.98
23	toilets	0.45	0.74	1.34	1.57	1.93	1.78	2.46	4.84	1.76
24	other miscellaneous	0.70	0.96	1.50	3.19	3.68	3.61	6.68	8.29	3.25
25	conveyance	—	0.35	0.52	0.80	1.92	2.80	3.45	10.89	1.95
26	ceremonials	0.03	0.06	0.08	0.46	0.20	0.34	2.00	4.21	0.67
27	services	0.04	0.42	0.77	0.90	2.02	3.08	3.12	9.43	1.95
28	rents	0.09	0.20	0.60	0.76	2.08	3.39	3.82	8.16	1.88
29	taxes	—	—	—	0.01	0.12	0.13	0.09	9.46	0.68
30	total : non-food items	4.30	10.26	15.89	25.17	39.49	53.15	70.36	144.09	37.80
31	total : all items	20.62	39.57	63.42	87.77	110.38	137.56	173.13	291.24	104.26
32	no. of households	17	61	117	101	73	47	50	34	500
33	no. of persons	18	148	458	464	350	245	306	229	2218

TABLE 9.3 :. PER CAPITA CONSUMER EXPENDITURE PER MONTH IN RUPEES FOR DIFF-
ERENT LEVELS OF MONTHLY PER CAPITA CONSUMER EXPENDITURE

reference period : February 1954

sl. no.	items of consumption	per capita consumption in rupees per month at levels of per capita monthly total expenditure								
		5–10	11-15	16-20	21-25	26-30	31-40	41-60	61–	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	all cereals	4.32	5.39	5.91	6.05	6.83	7.14	7.46	7.68	6.06
2	pulses & products	0.32	0.48	0.59	0.70	0.73	0.82	1.10	1.19	0.64
3	milk & products	0.67	1.25	2.22	2.88	3.33	4.11	5.94	11.50	2.74
4	vegetables	0.31	0.66	0.78	1.10	1.14	1.58	2.04	4.30	1.04
5	fruits and nuts	0.05	0.07	0.17	0.25	0.46	0.68	1.14	3.81	0.38
6	meat, fish and eggs	0.01	0.12	0.16	0.21	0.35	0.36	0.90	2.22	0.28
7	oils and products	0.52	1.09	1.37	1.62	1.91	2.06	2.36	3.35	1.51
8	sugar and gur	0.51	0.88	1.12	1.38	1.59	1.71	2.05	2.44	1.26
9	salt and species	0.18	0.30	0.38	0.43	0.53	0.50	0.65	1.47	0.43
10	beverages and refresh- ments	0.12	0.31	0.44	0.64	0.66	0.90	1.93	3.20	0.64
11	total : food-items	7.01	10.55	13.14	15.26	17.53	19.86	25.57	41.16	14.98
12	tobacco & products, *pan* etc.	0.10	0.23	0.24	0.37	0.60	0.54	1.28	2.05	0.42
13	drugs and intoxicants	—	0.01	0.03	0.05	0.06	0.13	0.31	1.70	0.09
14	fuel and light	0.73	1.09	1.34	1.50	1.70	1.95	2.47	4.55	1.51
15	clothing and foot-wear	0.21	0.69	1.14	2.28	3.04	4.84	7.01	15.17	2.39
16	bedding etc.	—	—	0.02	0.20	0.29	0.15	0.51	0.72	0.13
17	furniture and equip- ments	—	0.03	0.01	0.09	0.24	0.49	0.86	0.26	0.15
18	utensils	—	0.02	0.07	0.11	0.19	0.22	0.48	0.74	0.13
19	ornaments	—	—	—	—	—	—	—	1.00	0.02
20	amusements and sports	0.00	0.00	0.01	0.05	0.06	0.14	0.26	1.90	0.09
21	books and education	0.09	0.10	0.20	0.43	0.51	0.90	1.68	0.74	0.40
22	medicines	0.01	0.07	0.19	0.34	0.52	0.91	1.22	4.59	0.45
23	toilets	0.15	0.22	0.31	0.41	0.49	0.43	0.85	1.98	0.40
23	other miscellaneous	0.20	0.37	0.49	0.75	0.82	0.97	1.34	5.34	0.73
25	conveyance	0.01	0.06	0.16	0.37	0.60	0.52	0.72	6.92	0.44
26	ceremonials	0.00	0.00	0.05	0.05	0.24	0.50	0.70	0.54	0.15
27	services	0.08	0.16	0.24	0.33	0.51	0.70	0.67	5.10	0.44
28	rents	0.11	0.14	0.20	0.42	0.37	0.57	0.83	5.13	0.42
29	taxes	0.00	—	0.01	0.01	—	0.04	0.02	6.02	0.16
30	total : non-food items	1.69	3.19	4.71	7.76	10.24	14.00	21.21	64.45	8.52
31	total : all items	8.70	13.74	17.85	23.02	27.77	33.86	46.78	105.61	23.50
32	no. of persons	158	479	593	337	269	208	120	54	2218
33	no. of households	23	89	121	81	65	58	38	25	500

TABLE 9.4 : PERCENTAGE CONSUMER EXPENDITURE PER MONTH AT DIFFERENT LEVELS OF MONTHLY PER CAPITA CONSUMER EXPENDITURE

(reference period : February 1954)

sl. no.	items of consumption	percentage consumption for the month of February 1954 at levels of per capita monthly total expenditure								
		5-10	11-15	16-20	21-25	26-30	31-40	41-60	61-	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	all cereals	49.7	39.2	33.1	26.3	24.6	21.1	16.0	7.3	25.8
2	pulses & products	3.6	3.5	3.3	3.1	2.6	2.4	2.3	1.1	2.7
3	milk & products	7.7	9.1	12.4	12.5	12.0	12.1	12.7	10.9	11.7
4	vegetables	3.6	4.8	4.4	4.8	4.1	4.7	4.4	4.1	4.4
5	fruits & nuts	0.5	0.5	0.9	1.1	1.7	2.0	2.4	3.6	1.6
6	meat, fish, eggs	0.2	0.9	0.9	0.9	1.3	1.1	1.9	2.1	1.2
7	oils & products	6.0	7.9	7.7	7.0	6.9	6.1	5.1	3.2	6.5
8	sugar & gur	5.8	6.4	6.3	6.0	5.7	5.0	4.4	2.3	5.3
9	salt & spices	2.1	2.2	2.1	1.9	1.9	1.5	1.4	1.4	1.8
10	beverages & refreshments	1.4	2.3	2.5	2.7	2.3	2.7	4.1	3.0	2.7
11	total : food items	80.6	76.8	73.6	66.3	63.1	58.7	54.7	39.0	63.7
12	tobacco & products, pan etc.	1.2	1.7	1.4	1.6	2.2	1.6	2.7	1.9	1.8
13	drugs & intoxicants	—	0.1	0.2	0.2	0.2	0.4	0.7	1.6	0.4
14	fuel & light	8.4	7.9	7.5	6.5	6.1	5.8	5.3	4.3	6.4
15	clothing & foot-wear	2.4	5.0	6.4	9.9	10.9	14.3	15.0	14.4	10.2
16	bedding etc.	—	—	0.1	0.9	1.1	0.4	1.1	0.7	0.5
17	furniture, equipments	—	0.2	0.0	0.4	0.9	1.4	1.8	0.2	0.6
18	utensils	—	0.2	0.4	0.5	0.7	0.7	1.0	0.7	0.5
19	ornaments	—	—	—	—	—	—	—	0.9	0.1
20	amusements, sports	0.0	0.0	0.1	0.2	0.2	0.4	0.6	1.8	0.4
21	books & education	1.0	0.7	1.1	1.9	1.8	2.6	3.6	0.7	1.7
22	medicines	0.1	0.5	1.1	1.5	1.9	2.7	2.6	4.3	1.9
23	toilets	1.7	1.6	1.8	1.8	1.8	1.3	1.8	1.9	1.7
24	other miscellaneous	2.3	2.7	2.7	3.3	3.0	2.8	2.9	5.1	3.1
25	conveyance	0.1	0.4	0.9	1.6	2.1	1.5	1.5	6.6	1.9
26	ceremonials	0.0	0.0	0.3	0.2	0.9	1.5	1.5	0.5	0.7
27	services	0.9	1.2	1.3	1.4	1.8	2.1	1.4	4.8	1.9
28	rents	1.3	1.0	1.1	1.8	1.3	1.7	1.8	4.9	1.8
29	taxes	0.0	—	0.0	0.0	—	0.1	0.0	5.7	0.7
30	total : non-food items	19.4	23.2	26.4	33.7	36.9	41.3	45.3	61.0	36.3
31	total : all items	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
32	no. of persons	158	479	593	337	269	208	120	54	2218
33	no. of households	23	89	121	81	65	58	38	25	500

TABLE 9.5 : PER CAPITA CONSUMPTION OF FOOD ITEMS PER MONTH IN SEERS FOR DIFFERENT LEVELS OF MONTHLY EXPENDITURE OF HOUSEHOLDS

(reference period : February 1954)

sl. no.	items of consumption	per capita consumption of food items in seers per month at levels of expenditure (Rs.) per month								
		8-25	26-50	51-75	76-100	101-125	126-150	151-200	201 & above	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	wheat	14.97	12.88	10.83	12.21	12.04	10.30	11.50	13.09	11.74
2	other cereals	2.05	4.14	2.87	2.10	2.33	2.48	2.53	0.79	2.38
3	all cereals	17.02	17.02	13.70	14.31	14.37	12.78	14.03	13.88	14.12
4	pulses and products	1.18	0.94	0.79	1.01	0.88	1.03	1.16	1.30	0.99
5	milk and products	3.45	3.66	3.30	4.38	5.06	7.92	6.02	6.07	5.01
6	vegetables	4.54	4.06	3.07	3.00	3.40	3.98	3.93	4.05	3.49
7	fruits and nuts	—	0.31	0.23	0.17	0.38	0.62	0.92	1.26	0.49
8	meat, fish and eggs	—	0.02	0.05	0.12	0.10	0.55	0.33	0.22	0.18
9	oils and products	1.36	0.82	0.60	0.64	0.79	0.72	0.75	0.75	0.71
10	sugar and gur	1.50	1.51	1.32	1.52	1.56	1.81	1.83	1.72	1.58
11	salt and spices	0.87	0.65	0.49	0.48	0.50	0.48	0.53	0.49	0.51
12	no. of households	10	36	65	64	47	28	33	17	300
13	no. of persons	11	70	267	296	226	145	190	127	1332

TABLE 9.6 : PER HOUSEHOLD CONSUMPTION OF FOOD ITEMS PER MONTH IN SEERS FOR DIFFERENT LEVELS OF MONTHLY EXPENDITURE OF HOUSEHOLDS.

(reference period : February 1954)

sl. no.	items of consumption	per household consumption of food items in seers per month at levels of expenditure (Rs.) per month								
		8-25	26-50	51-75	76-100	101-125	126-150	151-200	201 & above	all levels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	wheat	16.47	25.05	44.48	56.50	57.85	53.34	66.20	97.82	52.11
2	other cereals	2.26	8.05	11.82	9.70	11.24	12.84	14.58	5.90	10.57
3	all cereals	18.73	33.10	56.30	66.20	69.09	66.18	80.78	103.72	62.68
4	pulses and products	1.30	1.84	3.23	4.67	4.21	5.31	6.66	9.72	4.40
5	milk and products	3.80	7.12	13.56	20.26	24.36	41.00	34.64	45.37	22.27
6	vegetables	5.00	7.89	12.62	13.69	16.35	20.64	22.60	30.24	15.50
7	fruits and nuts	—	0.61	0.94	0.82	1.85	3.21	5.03	9.43	2.16
8	meat, fish and eggs	—	0.04	0.21	0.52	0.47	1.07	1.88	1.62	0.65
9	oils and products	1.49	1.60	2.50	2.94	3.78	3.76	4.33	5.58	3.15
10	sugar and gur	1.65	2.93	5.44	7.04	7.48	9.38	10.54	12.82	7.02
11	salt and spices	1.00	1.27	2.00	2.23	2.40	2.51	3.02	3.68	2.25
12	no. of households	10	36	65	64	47	28	33	17	300
13	no. of persons	11	70	267	296	226	145	190	127	1332

TABLE 10.1 : AVERAGE RECEIPTS IN FEBRUARY 1954 PER HOUSEHOLD (OVER ALL HOUSEHOLDS) DISTRIBUTED BY SOURCE OF RECEIPTS, MONTHLY EXPENDITURE LEVEL, AND BY NATURE OF EMPLOYMENT OF PRINCIPAL EARNER OF HOUSEHOLD

sl. no.	expenditure level	number of		average receipts per household in February 1954 from—									total (10-13)
		house-holds	per-sons	occu-pa-tion	home pro-duce	govt. dole	re-mitt-ances	other sour-ces	sub-total (5-9)	past sav-ings	sale of assets	loans	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	I. households with principal earner in stable employment												
1	8— 25	1	2	16.0	6.0	—	—	—	22.0	2.0	—	—	24.0
2	26— 50	14	34	48.9	0.7	—	—	1.1	50.7	—	—	3.8	54.5
3	51— 75	53	207	65.2	1.8	—	2.0	0.2	69.2	1.2	1.1	9.0	80.5
4	76—100	56	252	76.6	2.1	—	0.8	—	79.5	3.2	2.9	12.2	97.8
5	101—125	49	230	86.0	2.6	1.2	1.1	—	90.9	8.5	4.3	20.7	124.4
6	126—150	35	173	106.2	8.1	—	5.3	0.2	119.8	10.9	1.1	19.9	151.7
7	151—200	38	237	124.6	3.2	0.8	6.7	0.7	136.0	12.0	8.0	52.9	208.9
8	201—	28	184	278.1	6.9	—	5.2	0.4	290.6	36.2	—	42.8	369.6
9	total	274	1319	105.5	3.5	0.3	2.9	0.2	112.4	9.2	2.8	22.4	146.8
	2. households with principal earner in temporary employment												
10	8— 25	2	2	4.0	—	—	10.0	3.0	17.0	—	—	—	17.0
11	26— 50	20	62	35.4	1.7	0.9	0.4	0.3	38.7	0.9	—	5.8	45.4
12	51— 75	37	147	41.4	2.3	—	0.5	0.1	44.3	3.0	2.2	16.9	66.4
13	76—100	27	133	46.7	2.3	0.9	2.1	0.1	52.1	4.3	13.7	35.1	105.2
14	101—125	12	65	39.3	5.8	—	—	0.8	45.9	13.0	16.7	54.2	129.8
15	126—150	10	62	51.5	3.3	—	5.7	—	60.5	11.7	7.0	71.1	150.3
16	151—200	8	46	72.0	9.3	2.2	1.9	—	85.4	31.0	—	49.5	165.9
17	201—	4	28	35.8	11.5	—	—	—	47.3	181.2	225.5	—	454.0
18	total	120	545	43.4	3.4	0.5	1.4	0.2	48.9	12.4	13.5	28.7	103.5
	3. households with principal earner having no work												
19	8— 25	14	14	0.4	0.6	17.4	1.1	0.2	19.7	0.8	—	1.0	21.5
20	26— 50	27	52	1.6	1.0	18.6	7.2	0.9	29.3	2.5	—	8.6	40.4
21	51— 75	27	104	2.2	1.0	32.6	14.7	—	50.5	6.1	0.9	10.1	67.6
22	76—100	18	79	5.8	4.8	33.0	12.2	—	55.8	—	6.8	26.3	88.9
23	101—125	12	55	6.3	1.0	45.6	19.2	—	72.1	2.7	—	36.7	111.5
24	126—150	2	10	0.5	10.5	74.0	30.0	—	115.0	—	—	31.0	146.0
25	151—200	4	23	13.0	0.3	75.3	—	—	88.6	—	35.0	59.7	183.3
26	201—	2	17	4.0	2.5	32.5	12.5	—	51.5	18.5	—	209.5	279.5
27	total	106	354	3.3	1.8	30.9	10.8	0.3	47.1	2.9	2.7	20.3	73.0
	4. all households												
28	8— 25	17	18	1.5	0.8	14.2	1.6	0.4	18.5	0.8	—	0.8	20.1
29	26— 50	61	148	23.5	1.2	8.5	3.3	0.8	37.3	1.4	—	6.6	45.3
30	51— 75	117	458	43.1	1.8	7.5	4.5	0.1	57.0	2.9	1.4	11.8	73.1
31	76—100	101	464	56.0	2.6	6.1	3.2	0.0	67.9	2.9	6.5	20.8	98.1
32	101—125	73	350	65.2	2.9	8.3	3.9	0.1	80.4	8.3	5.6	28.9	123.2
33	126—150	47	245	90.2	7.2	3.1	6.4	0.1	107.0	10.6	2.3	31.3	151.2
34	151—200	50	306	107.2	3.9	7.0	5.4	0.5	124.0	14.1	8.9	53.0	200.0
35	201—	34	229	233.5	7.2	1.9	5.0	0.4	248.0	52.2	26.5	47.6	374.3
36	total	500	2218	68.9	3.1	6.9	4.2	0.2	83.3	8.6	5.4	23.5	120.8

no. of households surveyed : 500   total no. of households : 5374

TABLE 10.2 : NUMBER OF HOUSEHOLDS AND AVERAGE MONTHLY RECEIPT PER HOUSEHOLD (EFFEC-TIVE SAMPLE) BY SOURCES OF RECEIPT AND LEVEL OF MONTHLY EXPENDITURE OF HOUSE-HOLDS.

sl. no.	monthly expendi-ture (Rs.)	no. of total house-holds	average total receipts	sources of receipts															
				occupation		home produce		govt. dole		remittances		others		past saving		sale of assets		loans	
				no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.	no. of house-holds	amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1	8— 25	17	20.1	3	8.3	6	2.3	13	18.6	3	9.0	2	3.0	3	4.7	—	—	4	3.5
2	26— 50	61	45.3	36	39.9	12	6.0	21	24.8	10	20.2	4	11.8	6	13.8	—	—	31	12.9
3	51— 75	117	73.1	94	53.7	33	6.2	17	51.7	17	31.0	4	3.0	23	14.7	5	33.0	66	20.9
4	76—100	101	98.1	86	65.7	26	10.3	12	51.6	11	29.2	1	2.0	18	16.4	12	54.4	61	34.5
5	101—125	73	123.2	63	75.6	16	13.1	11	55.1	7	40.3	1	10.0	21	28.8	5	82.0	61	49.0
6	126—150	47	151.2	45	94.1	22	15.4	2	74.0	7	43.1	1	6.0	13	38.3	2	55.0	43	58.7
7	151—200	50	200.0	47	114.1	9	21.9	6	58.4	7	38.6	1	25.0	15	46.9	4	111.2	25	77.9
8	201—	34	374.3	30	264.6	11	22.2	1	65.0	5	34.0	1	12.0	11	161.4	2	451.0	34	107.9
9	total	500	120.8	404	85.3	135	11.5	83	41.3	67	31.4	15	8.0	110	39.2	30	89.5	15	42.1

no. of households surveyed : 500　　　total no. of households : 5374

TABLE 11.1 : LIVE BIRTHS DURING ONE YEAR (MARCH 1953—FEBRUARY 1954) BY AGE OF MOTHER AND SEX OF THE INFANT

sl. no.	age of mother	married females in the age group	births			births per 1000 mothers
			males	females	total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	upto 14	5	—	—	—	—
2	15—19	74	7	6	13	176
3	20—24	92	9	9	18	196
4	25—29	70	9	5	14	200
5	30—34	40	5	2	7	175
6	35—39	38	4	1	5	132
7	40—44	33	—	2	2	61
8	45—49	32	1	—	1	31
9	50 & above	41	—	—	—	—
10	all ages	425	35	25	60	141

TABLE 11.2 : DEATHS DURING ONE YEAR (MARCH 1953—FEBRUARY 1954) BY AGE AT DEATH AND CAUSE OF DEATH

sl. no.	cause of death	males						females						all
		age in completed years						age in completed years						
		0	1-4	5-14	15-59	60-	total	0	1-4	5-14	15-59	60-	total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	malaria	—	—	—	—	—	—	—	1	—	—	—	1	1
2	typhoid	1	—	—	—	—	1	—	—	—	1	—	1	2
3	pneumonia	—	—	—	—	—	—	1	—	—	—	—	1	1
4	other fevers	1	1	—	—	—	2	—	—	—	—	—	—	2
5	stomach ailments	1	—	—	—	—	1	—	—	—	1	1	2	3
6	respiratory diseases	—	—	—	—	2	2	—	—	—	—	—	—	2
7	old age	—	—	—	—	1	1	—	—	—	—	—	—	1
8	childbirth complications	—	—	—	—	—	—	2	—	—	1	—	3	3
9	other causes	1	1	2	—	1	5	2	—	—	1	—	3	8
10	all causes	4	2	2	–	4	12	5	1	—	4	1	11	23
11	death rate per mille	125	17	6	–	53	11	227	9	—	7	11	10	10.4

no. of households surveyed : 500   total no. of households : 5374

24

TABLE 11.3 : MORBIDITY DURING 3 MONTHS (DECEMBER 1953—FEBRUARY 1954) BY AGE, SEX AND SICKNESS

sl. no.	sickness	age group 0			1-4			5-14			15-59			60–			all ages		
		male	female	total	male	female	total	male	female	total	male	female	total	male	female	total	male	female	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1	malaria	–	–	–	3	3	6	1	8	9	12	16	28	3	1	4	19	28	47
2	typhoid	–	–	–	2	–	2	1	1	2	1	–	1	–	–	–	4	1	5
3	pneumonia	–	–	–	4	2	6	–	–	–	1	1	2	–	–	–	5	3	8
4	other fevers	1	–	1	1	1	2	1	2	3	3	1	4	–	–	–	6	4	10
5	tuberculosis	–	–	–	–	–	–	–	–	–	2	1	3	–	–	–	2	1	3
6	stomach ailments	–	–	–	2	2	4	3	1	4	6	11	17	2	3	5	13	17	30
7	respiratory diseases	–	–	–	1	–	1	–	–	–	5	2	7	–	3	3	6	5	11
8	old age	–	–	–	–	–	–	–	–	–	1	2	3	2	3	5	3	5	8
9	heart disease	–	–	–	–	–	–	–	–	–	–	1	1	1	–	1	1	1	2
10	mental illness	–	–	–	–	–	–	–	–	–	1	1	2	–	2	2	1	3	4
11	childbirth complications	–	–	–	–	–	–	–	–	–	–	4	4	–	–	–	–	4	4
12	accidents	–	–	–	–	–	–	1	–	1	2	1	3	–	–	–	3	1	4
13	other causes	–	–	–	3	1	4	1	2	3	15	24	39	1	2	3	20	29	49
14	all causes	1	–	1	16	9	25	8	14	22	49	65	114	9	14	23	83	102	185

TABLE 11.4 : DURATION OF SICKNESS DURING 3 MONTHS (DECEMBER 1953–FEBRUARY 1954) FOR EARNERS AND EARNING DEPENDENTS AND FOR ALL

sl. no.	sickness	earners and earning dependents							non-earning dependents							all						
		duration of sickness in days during 90 days																				
		0-3	4-7	8-15	16-30	31-60	61-90	all	0-3	4-7	8-15	16-30	31-60	61-90	all	0-3	4-7	8-15	16-30	31-60	61-90	all
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
1	malaria	3	5	5	2	–	–	15	3	14	7	5	2	1	32	6	19	12	7	2	1	47
2	pneumonia and other fevers	1	3	2	1	–	–	7	1	4	6	1	1	3	16	2	7	8	2	1	3	23
3	stomach ailments	–	3	2	2	1	4	12	2	3	5	3	2	3	18	2	6	7	5	3	7	30
4	respiratory diseases	1	2	–	2	1	3	9	–	–	–	–	–	2	2	1	2	–	2	1	5	11
5	old age	–	–	1	1	–	2	4	–	1	2	–	–	1	4	–	1	3	1	–	3	8
6	all others	1	5	8	4	3	6	27	1	7	11	8	–	12	39	2	12	19	12	3	18	66
7	all sicknesses	6	18	18	12	5	15	74	7	29	31	17	5	22	111	13	47	49	29	10	37	185

no. of households surveyed: 500   no. of persons in sample households: 2218   total no. of households: 5374

TABLE 12.1 : DISTRIBUTION OF HOUSEHOLDS BY TYPE OF CONSTRUCTION, OCCUPANCY STATUS, NUMBER OF ROOMS, WATER SUPPLY, LATRINE AND COVERED AREA OF ACCOMMODATION

sl. no.	class of house	1. type of construction			no. of house-holds	percentage
		plinth	wall	roof		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	pucca	brick	brick with plaster	cement or brick tiles on wooden battens	387	96.8
2	semi-pucca	brick	brick with mud plaster.	c.i. sheets	6	1.5
3		brick	c.i. sheets	c.i. sheets	4	1.0
4		wood	wood	c.i. sheets	1	0.2
5		all types			11	2.7
6	katcha	brick	tented	tented	1	0.2
7		brick	other	thatched	1	0.3
8		all types			2	0.5
9		all types of houses			400	100.0

sl. no.	class of house	2. occupancy status			3. number of rooms				4. water supply		
		owned	rented	sublet	one	two	three	four	house tap	commu-nity tap	private well
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	pucca	15	369	3	73	289	12	13	19	362	6
2	semipucca	2	9	–	2	6	3	–	4	7	–
3	katcha	–	2	–	2	–	–	–	1	1	–
4	all	17	380	3	77	295	15	13	24	370	6

sl. no.	class of house	5. latrine type				6. covered area				
		no latrine	latrine in indi-vidual use	in use by two house holds	in use by three or more house holds	area in sq. ft.				
						upto 50	101–200	201–300	301–600	601–above
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	pucca	33	245	61	48	1	72	3	297	14
2	semipucca	2	6	1	2	—	—	2	5	4
3	katcha	2	—	—	—	1	1	—	—	—
4	all	37	251	62	50	2	73	5	302	18

no. of households surveyed : 400   total no. of households : 5374

TABLE 13.1: COMPARISON OF ESTIMATES OF CERTAIN CHARACTERISTICS OBTAINED FROM EACH OF 5 SUB–SAMPLES OF 100 HOUSEHOLDS AND THE FULL SAMPLE OF 500 HOUSEHOLDS TOGETHER WITH ESTIMATES OF STANDARD ERROR*

sl. no.	item of information	sub-sample estimates					combined estimate with its standard error
		1	2	3	4	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	households migrated (percentage)	94.0	95.0	96.0	96.0	97.0	95.6 ± 0.58
2	persons migrated (percentage)	81.3	79.7	78.4	80.9	79.1	79.9 ± 0.56
3	households not-registered (percentage)	13.0	14.0	12.0	10.0	7.0	11.2 ± 1.35
4	average household size	4.38	4.48	4.36	4.41	4.55	4.44± 0.04
5	households (percentage) with—						
	i) one, two & three members	34.0	34.0	40.0	44.0	34.0	37.2 ± 1.92
	ii) four, five & six members	53.0	48.0	42.0	35.0	49.0	45.4 ± 3.46
	iii) seven, eight & nine members	9.0	17.0	14.0	17.0	15.4	14.4 ± 1.54
	iv) ten & more members	4.0	1.0	4.0	4.0	2.0	3.0 ± 0.58
6	sex ratio : males per 1000 females	896	1064	955	909	1013	966 ±32.30
7	age distribution (percentage)—						
	i) infants : − 0	2.1	3.1	2.3	3.2	1.5	2.4 ± 0.33
	ii) children : 1– 4	8.9	11.4	10.8	10.0	12.3	10.7 ± 0.65
	iii) boys and girls : 5–14	29.4	27.0	30.7	29.9	28.6	29.1 ± 0.71
	iv) young men & women : 15–34	35.2	32.6	33.5	33.1	32.7	33.4 ± 0.50
	v) middle aged persons : 35–54	14.4	17.2	15.1	14.7	17.6	15.8 ± 0.62
	vi) elderly persons : 55–	10.0	8.7	7.6	9.1	7.3	8.6 ± 0.52
8	marital status : persons (percentage)—						
	i) single	51.1	51.6	54.8	54.0	54.1	53.1 ± 0.71
	ii) married	39.5	38.4	33.0	37.2	38.2	37.3 ± 1.25
	iii) widowed and separated male	1.4	2.7	2.1	2.0	1.8	2.0 ± 0.25
	female	8.0	7.3	10.1	6.8	5.9	7.6 ± 0.81
9	educational standard : persons (percentage)						
	male (i) illiterate	12.6	15.6	10.1	12.9	12.5	12.8 ± 1.06
	(ii) literate but not middle	26.9	27.7	28.5	25.9	28.1	27.5 ± 0.50
	(iii) middle but not matric	4.3	4.7	6.4	6.3	7.0	5.7 ± 0.52
	(iv) matric and intermediate	3.0	3.4	3.9	2.3	2.7	3.0 ± 0.31
	(v) graduate and post-graduate	0.4	0.2	—	0.2	—	0.2 ± 0.08
	female (iii) (i) illiterate	31.3	30.4	26.8	32.9	26.6	29.5 ± 1.21
	(ii) literate but not middle	18.5	16.7	22.5	17.7	22.4	19.6 ± 1.12
	(iii) middle but not matric	3.0	0.9	1.8	1.6	0.5	1.5 ± 0.48
	(iv) matric and intermediate	—	0.2	—	0.2	0.2	0.1 ± 0.04
	(v) graduate and post-graduate	—	0.2	—	—	—	0.1 ± 0.04
10	earning strength : households (percentage) with earners and earning dependents numbering—						
	i) one	73.0	71.0	79.0	73.0	67.0	72.6 ± 2.31
	ii) two	22.0	25.0	17.0	21.0	28.0	22.6 ± 2.11
	iii) three and four	5.0	4.0	4.0	6.0	5.0	4.8 ± 0.38
11	industrial status : percentage of—						
	male (i) working	44.0	42.4	44.6	42.4	43.7	43.4 ± 0.46
	(ii) seeking employment	5.3	3.5	3.8	4.3	4.8	4.3 ± 0.35
	(iii) not in labour force	50.7	54.1	51.6	53.3	51.5	52.3 ± 0.65
	female (i) working	4.3	6.5	5.4	7.3	5.8	5.9 ± 0.58
	(ii) seeking employment	0.4	—	—	0.9	—	0.3 ± 0.17
	(iii) not in labour force	95.3	93.5	94.6	91.8	94.2	93.8 ± 0.67

* Standard error = $\dfrac{\text{Standard deviation } (\sigma)}{\sqrt{5}}$, where $\sigma = \dfrac{\text{range (R)}}{2.326}$

TABLE 13.1 : —*(continued)*

sl. no.	item of information	sub-sample estimates					combined estimate with its standard error
		1	2	3	4	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
11	industrial status : percentage of *(contd.)*						
	(i) working	23.1	25.0	24.6	24.0	24.8	24.3 ± 0.37
all (ii) seeking employment		2.7	1.8	1.8	2.5	2.4	2.3 ± 0.17
persons(iii) not in labour force		74.2	73.2	73.6	73.5	72.8	73.4 ± 0.27
12	income, as percentage of total, of						
	i) earners, from all sources	97.9	97.9	99.0	97.9	96.7	98.1 ± 0.44
	ii) earning dependents from all sources	2.1	2.1	1.0	2.1	3.3	1.9 ± 0.44
13	income (percentage) of earners and earning dependents from—						
	i) principal occupation	82.5	85.4	86.7	83.3	84.4	84.5 ± 0.81
	ii) subsidiary occupation	2.4	4.6	2.5	2.6	4.7	3.4 ± 0.44
	iii) cash doles and remittances	15.1	10.0	10.8	14.1	10.9	12.1 ± 0.98
14	economic status : persons (percentage)						
	i) earners–male	75.8	76.7	75.2	66.2	72.7	73.7 ± 2.02
	ii) earners–female	13.6	14.3	16.8	18.8	12.9	15.2 ± 1.13
	iii) earning dependents–male	3.8	2.2	3.2	6.7	5.8	4.4 ± 0.87
	iv) earning dependents–female	6.8	6.8	4.8	8.3	8.6	7.1 ± 0.73
15	expenditure levels : percentage of households in expenditure level in rupees per month—						
	i) 0—50	17.0	15.0	13.0	20.0	13.0	15.6 ± 1.35
	ii) 51—100	47.0	42.0	44.0	36.0	49.0	43.6 ± 2.50
	iii) 101—150	21.0	24.0	24.0	27.0	24.0	24.0 ± 1.15
	iv) 151—	15.0	19.0	19.0	17.0	14.0	16.8 ± 0.96
16	percentage of average receipts from—						
	i) occupation	52.9	60.2	60.8	56.0	55.8	57.0 ± 1.52
	ii) home produce	2.7	1.7	2.7	1.5	4.3	2.6 ± 0.54
	iii) govt. doles	5.0	5.5	5.7	5.9	6.5	5.7 ± 0.29
	iv) remittances	3.0	5.6	1.2	6.1	1.5	3.5 ± 0.94
	v) other sources	—	0.1	0.4	0.3	0.2	0.2 ± 0.08
	vi) past savings	10.9	6.0	5.9	5.7	6.6	7.1 ± 1.00
	vii) sale of assets	9.0	2.8	3.3	5.4	1.3	4.5 ± 1.48
	viii) loans	16.5	18.1	20.0	19.1	23.8	19.4 ± 1.40

total number of households : 5374

189

TABLE 13.2 : COMPARISON OF FIVE SUB-SAMPLE PERCENTAGES OF PER CAPITA CON-
SUMPTION OF DIFFERENT ITEMS OF CONSUMPTION

sl. no.	items of consumption	per capita consumption as per cent of total					combined estimates
		sub-sample estimates					
		1	2	3	4	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all cereals	25.8	25.3	25.0	26.2	26.8	25.8
2	pulses and products	2.8	2.7	2.7	2.7	2.7	2.7
3	milk and products	11.5	12.5	11.3	10.8	12.3	11.7
4	vegetables	4.1	4.5	4.6	4.5	4.3	4.4
5	fruits and nuts	1.2	1.8	1.8	1.8	1.5	1.6
6	meat, fish and eggs	1.2	1.5	1.0	1.2	1.1	1.2
7	oils and products	7.4	5.9	6.3	6.5	6.2	6.5
8	sugar and gur	5.1	5.3	5.2	5.1	6.1	5.3
9	salt and spices	1.9	1.8	1.8	1.8	1.8	1.8
10	beverages and refreshments	2.7	2.8	2.8	2.6	2.6	2.7
11	total : food	63.7	64.1	62.5	63.2	65.4	63.7
12	tobacco products : *pan, supari*	1.3	2.2	2.2	1.8	1.4	1.8
13	drugs and intoxicants	0.1	1.0	0.3	0.4	0.2	0.4
14	fuel and light	6.3	6.4	6.2	6.8	6.3	6.4
15	clothing and footwear	9.5	9.9	11.4	9.0	11.0	10.2
16	bedding etc.	0.2	0.4	0.8	1.1	0.3	0.6
17	furniture and equipment	0.3	0.6	0.9	0.9	0.5	0.6
18	utensils	0.3	0.6	0.5	0.5	0.8	0.5
19	ornaments	—	—	—	—	0.6	0.1
20	amusements and sports	0.7	0.1	0.4	0.2	0.5	0.4
21	books and education	1.3	2.8	1.9	1.7	0.7	1.7
22	medicines	2.3	2.1	1.7	1.7	1.6	1.9
23	toilets	1.4	1.8	1.6	1.8	1.8	1.7
24	other miscellaneous	1.9	2.4	4.2	3.5	3.5	3.1
25	conveyance	3.1	1.5	1.7	1.4	1.7	1.9
26	ceremonials	0.1	0.7	0.4	1.7	0.3	0.6
27	services	2.0	1.7	2.1	1.9	1.8	1.9
28	rents	2.6	1.7	1.2	2.1	1.5	0.8
29	taxes	2.9	0.0	—	0.3	0.1	0.7
30	total : non-food items	36.3	35.9	37.5	36.8	34.6	36.3
31	all items	100.0	100.0	100.0	100.0	100.0	100.0

number of households in each sample=100   total number of households=5374

MISCELLANEA

RELATIVE EFFICIENCY OF GAUGING AND EXACT MEASUREMENT IN ESTIMATING THE PROPORTION OF A POPULATION BETWEEN GIVEN LIMITS

By DES RAJ

Indian Statistical Institute, Calcutta

1. INTRODUCTION

In order to control the quality of a manufactured product, we may either actually measure the articles or simply gauge them. That it is quicker, easier and therefore cheaper to gauge an article than to measure it is obvious. What is not so widely understood is that the efficiency of the technique of gauging for controlling the quality of a product is also generally high. Stevens (1948) for example, shows that it is possible to achieve with ten gauged articles the same sensitivity of control of the mean as is given by eight articles exactly measured. The object of this note is to study the allied problem of estimating the proportion of the product lying between two specified limits. The relative efficiency of gauging as compared with exact measurement has been obtained for a wide class of distributions.

Let there be a population

$$f(x, \theta) \qquad \qquad \text{... (1)}$$

containing the parameters $\qquad \theta = (\theta_1, \theta_2, ..., \theta_k).$

The object is to estimate

$$P = \int_a^b f(x, \theta)dx, \qquad \qquad \text{... (2)}$$

where a and b are two specified constants.

Suppose we have a pair of gauges set to the values a and b of the variate x. Out of a sample of size N drawn from (1), let n fall between a and b. The estimate of P based on the gauging method is

$$p_{\text{gaug.}} = \frac{n}{N} \qquad \qquad \text{... (3)}$$

and the variance of the estimate is

$$P(1-P)/N. \qquad \qquad \text{... (4)}$$

If, instead of gauging the articles we actually measure them and estimate the parameters θ by θ^* the estimated proportion would be

$$p_{\text{meas.}} = \int_a^b f(x, \theta^*)dx. \qquad \qquad \text{... (5)}$$

Using the formula (Rao, 1952), large sample variance of (5), under usual assumptions, would be given by

$$\sum\sum \left\{ \left[\int_a^b \frac{\partial f}{\partial \theta_i}* \ dx \right]\left[\int_a^b \frac{\partial f}{\partial \theta_j}* \ dx \right]\right\}_{\theta^x=\theta} \text{Cov} \ (\theta_i{}^*, \theta_j{}^*). \qquad \ldots \ (6)$$

The relative efficiency of the gauging method is then the ratio of (6) and (4).

2. Efficiency of gauging for the type III population

The type III population is given by

$$f(x)dx, \quad m-\frac{2\sigma}{\alpha_3} \leqslant x < \infty, \ 0 \leqslant \alpha_3 \leqslant 2 \qquad \ldots \ (7)$$

where

$$f(x) = \frac{C}{\sigma}\left\{1+\frac{\alpha_3}{2}\frac{x-m}{\sigma}\right\}^{\frac{4}{\alpha_3^2}-1} e^{-\frac{2}{\alpha_3}\frac{x-m}{\sigma}} \qquad \ldots \ (8)$$

and

$$C = (4/\alpha_3^2)^{\frac{4}{\alpha_3^2}-\frac{1}{2}} e^{-4/\alpha_3^2}\left[\Gamma(4/\alpha_3^2)\right]^{-1}. \qquad \ldots \ (9)$$

The parameters m, σ and α_3 in (7) are the mean, variance and third standard moment respectively. We are to estimate

$$P = \int_{m+\lambda\sigma}^{m+\mu\sigma} f(x)dx = \int_\lambda^\mu f(t)dt \qquad \ldots \ (10)$$

where

$$f(t) = C\left(1+\frac{\alpha_3}{2}t\right)^{\frac{4}{\alpha_3^2}-1-2t/\alpha_3} e^{\ \ }, \quad -\frac{2}{\alpha_3} \leqslant t < \infty \qquad \ldots \ (11)$$

so that $f(t)$ is the standardised type III curve tabulated by Salvosa (1930). In this case we take

$$p_{\text{meas.}} = \int_{m+\lambda\sigma}^{m+\mu\sigma} \frac{C}{s}\left\{1+\frac{\alpha_3}{2}\left(\frac{x-\bar{x}}{s}\right)\right\}^{\frac{4}{\alpha_3^2}-1} e^{-\frac{2}{\alpha_3}\frac{x-\bar{x}}{s}}dx \qquad \ldots \ (12)$$

where $\bar{x}$ and s^2 are the sample mean and variance respectively.

We have $\qquad \left(\frac{\partial}{\partial\bar{x}} p_{\text{meas.}}\right)_\theta = \frac{l_\lambda - l_\mu}{\sigma}, \ \left(\frac{\partial}{\partial s^2} p_{\text{meas.}}\right)_\theta = \frac{\lambda l_\lambda - \mu l_\mu}{2\sigma^2}$

where l_μ and l_λ are the ordinates of (11) at μ and λ respectively.

Also $\qquad\qquad\qquad\qquad V(\bar{x}) = \frac{\sigma^2}{N}$

and in large samples $\qquad V(s^2) = \frac{\mu_4 - \mu_2^2}{N} = \frac{\sigma^4(2+\frac{3}{2}\alpha_3^2)}{N},$

$$\text{Cov} \ (\bar{x}, s^2) = \frac{\mu_3}{N} = \frac{\sigma^3\alpha_3}{N}.$$

RELATIVE EFFICIENCY OF GAUGING AND EXACT MEASUREMENT

Substituting in (6) we see that (12) is asymptotically normal with mean P and variance given by

$$\frac{1}{N}\left[(l_\mu-l_\lambda)^2+\left(\frac{1}{2}+\frac{3}{8}\alpha_3^2\right)(\mu l_\mu-\lambda l_\lambda)^2+\alpha_3(l_\mu-l_\lambda)(\mu l_\mu-\lambda l_\lambda)\right]. \qquad \ldots \text{(13)}$$

Putting $\int_{-2/\alpha_3}^{r} f(t)dt = a_r$, we see that the relative efficiency of gauging as compared with exact measurement is

$$\frac{(l_\mu-l_\lambda)^2+(\frac{1}{2}+\frac{3}{8}\alpha_3^2)(\mu l_\mu-\lambda l_\lambda)^2+\alpha_3(l_\mu-l_\lambda)(\mu l_\mu-\lambda l_\lambda)}{(a_\mu-a_\lambda)(1-a_\mu+a_\lambda)}. \qquad \ldots \text{(14)}$$

We shall study this efficiency for different degrees of skewness of this population. For $\alpha_3=0$, when the population is normal, the expression for the relative efficiency reduces to $\{(l_\mu-l_\lambda)^2+\frac{1}{2}(\mu l_\mu-\lambda l_\lambda)^2\}/P(1-P)$, as obtained by Baker (1949). The following cases will be considered :

Case (i) $\mu=\infty$. The relative efficiency in this case is

$$l_\lambda^2[1+\alpha_3\lambda+(\tfrac{1}{2}+\tfrac{3}{8}\alpha_3^2)\lambda^2][a_\lambda(1-a_\lambda)]^{-1}. \qquad \ldots \text{(15)}$$

The following table gives this efficiency for different degrees of skewness.

TABLE 1. RELATIVE EFFICIENCY OF SINGLE GAUGING FOR TYPE III POPULATION

α_3	0.0		0.2		0.4		0.8	
	P	eff.	P	eff.	P	eff.	P	eff.
2.00	.0228	.393	.0279	.411	.0324	.434	.0396	.493
1.50	.0668	.572	.0716	.573	.0754	.585	.0308	.624
1.00	.1587	.658	.1583	.662	.1572	.671	.1536	.698
0.50	.3085	.654	.2998	.662	.2910	.671	.2736	.688
0.00	.5000	.637	.4867	.636	.4734	.634	.4468	.627
−0.50	.6915	.654	.6826	.645	.6738	.638	.6561	.631
−1.00	.8413	.658	.8418	.663	.8432	.681	.8504	.796
−1.50	.9332	.572	.9393	.586	.9468	.625	.9676	.868
−2.00	.9773	.393	.9829	.384	.9888	.381	.9988	.307

Case (ii) $\mu = -\lambda$. The relative efficiency now is

$$\frac{(l_{-\lambda}-l_\lambda)^2+(\frac{1}{2}+\frac{3}{8}\alpha_3^2)\lambda^2(l_{-\lambda}+l_\lambda)^2-\lambda\alpha_3(l_{-\lambda}-l_\lambda)(l_{-\lambda}+l_\lambda)}{(a_{-\lambda}-a_\lambda)(1-a_{-\lambda}+a_\lambda)}. \qquad \ldots \text{(16)}$$

The following table gives this efficiency for different degrees of skewness.

TABLE 2. RELATIVE EFFICIENCY OF SYMMETRICAL GAUGING FOR TYPE III POPULATION

α_3	0.0		0.2		0.4		0.8	
λ	P	eff.	P	eff.	P	eff.	P	eff.
−0.10	.0797	.043	.0796	.043	.0794	.045	.0786	.049
−0.50	.3829	.262	.3829	.266	.3828	.276	.3824	.318
−1.00	.6827	.541	.6835	.552	.6860	.588	.6968	.756
−1.50	.8664	.652	.8676	.669	.8715	.721	.8873	.931
−2.00	.9545	.537	.9550	.547	.9565	.571	.9592	.561

25

3. Efficiency of Gauging for the Cauchy Population

The Cauchy population is

$$\frac{1}{\pi}\frac{1}{1+(x-\theta)^2}\,dx, \quad -\infty < x < \infty. \qquad \ldots \text{(17)}$$

We are required to estimate

$$P = \frac{1}{\pi}\int_{\theta+\lambda}^{\theta+\mu}\frac{dx}{1+(x-\theta)^2} = \frac{1}{\pi}\left[\tan^{-1}\mu - \tan^{-1}\lambda\right]. \qquad \ldots \text{(18)}$$

We consider the estimate

$$p_{\text{meas.}} = \frac{1}{\pi}\int_{\theta+\lambda}^{\theta+\mu}\frac{dx}{1+(x-\hat\theta)^2} \qquad \ldots \text{(19)}$$

where $\hat\theta$ is the maximum likelihood estimate of θ.

We have

$$\left(\frac{\partial}{\partial\hat\theta}\,p_{\text{meas.}}\right)_\theta = \frac{\mu^2-\lambda^2}{\pi(1+\lambda^2)(1+\mu^2)}$$

and in large samples

$$V(\hat\theta) = \frac{2}{N}.$$

Substituting in (6) we see that the large sample variance of (19) is

$$\frac{2}{N\pi^2}\frac{(\mu+\lambda)^2(\mu-\lambda)^2}{(1+\lambda^2)^2(1+\mu^2)^2} \qquad \ldots \text{(20)}$$

so that the relative efficiency of gauging as compared with exact measurement is given by

$$\frac{2}{\pi^2}\frac{(\mu+\lambda)^2(\mu-\lambda)^2}{(1+\lambda^2)^2(1+\mu^2)^2}\cdot\frac{1}{P(1-P)} \qquad \ldots \text{(21)}$$

where P is determined from (18).

The following cases will be considered.

Case (i) $\mu = \infty$.   The relative efficiency in this case is

$$\frac{2}{\pi^2}\frac{1}{(1+\lambda^2)^2}\cdot\frac{1}{P(1-P)} \qquad \ldots \text{(22)}$$

where

$$P = \frac{1}{\pi}\cot^{-1}\lambda. \qquad \ldots \text{(23)}$$

The following table gives the relative efficiency for different values of λ.

TABLE 3.   RELATIVE EFFICIENCY OF SINGLE GAUGING
FOR CAUCHY POPULATION

λ	P	eff.
2.00	.1476	.064
1.50	.1872	.126
1.00	.2500	.270
.50	.3524	.568
.00	.5000	.811

RELATIVE EFFICIENCY OF GAUGING AND EXACT MEASUREMENT

Case (ii) $\lambda = -\mu$. In this case the large sample variance of (19) is zero, which implies that the variance is of a smaller order than n^{-1}. The relative efficiency of gauging as compared with exact measurement is very small.

4. EFFICIENCY OF GAUGING FOR THE NORMAL POPULATION

Finally, we shall give detailed tables for the relative efficiency of gauging as compared to exact measurement for the most common distribution, the normal distribution. From these tables, it is found that it is possible to achieve with ten gauged articles the same efficiency for estimating the proportion P as given by six articles exactly measured.

TABLE 4. RELATIVE EFFICIENCY OF SYMMETRICAL GAUGING FOR NORMAL POPULATION

$-\lambda$	P	eff.	$-\lambda$	P	eff.	$-\lambda$	P	eff.
.05	.0399	.021	1.05	.7063	.562	2.05	.9596	.517
.10	.0797	.043	1.10	.7287	.581	2.10	.9643	.495
.15	.1192	.067	1.15	.7499	.598	2.15	.9689	.473
.20	.1585	.092	1.20	.7699	.613	2.20	.9722	.451
.25	.1974	.118	1.25	.7887	.626	2.25	.9756	.428
.30	.2358	.145	1.30	.8064	.636	2.30	.9786	.404
.35	.2737	.174	1.35	.8230	.644	2.35	.9812	.381
.40	.3108	.203	1.40	.8385	.649	2.40	.9836	.358
.45	.3473	.232	1.45	.8529	.652	2.45	.9857	.335
.50	.3829	.262	1.50	.8664	.652	2.50	.9876	.313
.55	.4177	.293	1.55	.8788	.650	2.55	.9892	.291
.60	.4515	.323	1.60	.8904	.645	2.60	.9907	.270
.65	.4843	.353	1.65	.9011	.639	2.65	.9920	.250
.70	.5161	.383	1.70	.9109	.630	2.70	.9931	.230
.75	.5467	.412	1.75	.9199	.619	2.75	.9940	.211
.80	.5763	.440	1.80	.9281	.606	2.80	.9949	.193
.85	.6047	.467	1.85	.9357	.591	2.85	.9956	.176
.90	.6319	.493	1.90	.9426	.574	2.90	.9963	.160
.95	.6579	.518	1.95	.9488	.556	2.95	.9968	.145
1.00	.6827	.541	2.00	.9545	.537	3.00	.9973	.131

TABLE 5. RELATIVE EFFICIENCY OF SINGLE GAUGING FOR NORMAL POPULATION

λ	P	eff.	λ	P	eff.	λ	P	eff.
.00	.5000	.637						
.05	.4801	.637	1.05	.1469	.654	2.05	.0202	.373
.10	.4602	.637	1.10	.1357	.650	2.10	.0179	.353
.15	.4404	.639	1.15	.1251	.644	2.15	.0158	.334
.20	.4207	.640	1.20	.1151	.637	2.20	.0139	.314
.25	.4013	.642	1.25	.1056	.629	2.25	.0122	.295
.30	.3821	.644	1.30	.0968	.620	2.30	.0107	.276
.35	.3632	.646	1.35	.0885	.609	2.35	.0094	.257
.40	.3446	.649	1.40	.0808	.598	2.40	.0082	.239
.45	.3264	.651	1.45	.0735	.585	2.45	.0071	.222
.50	.3085	.654	1.50	.0668	.572	2.50	.0062	.205
.55	.2912	.656	1.55	.0606	.557	2.55	.0054	.189
.60	.2743	.658	1.60	.0548	.542	2.60	.0047	.174
.65	.2578	.660	1.65	.0495	.525	2.65	.0040	.160
.70	.2420	.662	1.70	.0446	.508	2.70	.0035	.146
.75	.2266	.663	1.75	.0401	.490	2.75	.0030	.133
80	.2119	.663	1.80	.0359	.471	2.80	.0026	.121
.85	.1977	.663	1.85	.0322	.452	2.85	.0022	.110
.90	.1841	.662	1.90	.0287	.433	2.90	.0019	.099
.95	.1711	.661	1.95	.0256	.413	2.95	.0016	.089
1.00	.1587	.658	2.00	.0228	.393	3.00	.0013	.080

It may be noted that for symmetrical gauging the relative efficiency is maximum (65%) when λ is near about 1.50 and P is nearly 0.86, while for single gauging the relative efficiency is maximum (66%) when λ is in the neighbourhood of 0.80 when P is nearly 0.21.

5. RELATIVE EFFICIENCY OF GAUGING FOR EQUIVALENT COSTS

So far we have compared the relative efficiencies of the two methods of estimation assuming that the cost of gauging an article is the same as the cost of actually measuring it. Evidently, this is an over-simplification of the problem. In actual practice the cost of gauging an article would be much less than the cost of actually measuring it. Let

$$c_1 = \text{cost of gauging an article,}$$
$$c_2 = \text{cost of measuring an article,}$$
$$C = \text{total cost.}$$

Then we can gauge n_1 articles or measure n_2 of them for the same cost C, where $n_1 c_1 = n_2 c_2$. Then the relative efficiency of gauging, as obtained before, would be multiplied by c_2/c_1 throughout. As an illustration, the table below gives the efficiencies for different values of c_2/c_1. In the part enclosed, exact measurement is less efficient than gauging and its relative efficiency is shown.

TABLE 6.   RELATIVE EFFICIENCY OF SINGLE GAUGING FOR NORMAL POPULATION FOR EQUIVALENT COSTS

λ \ c_2/c_1	1.5	2.0	2.5	3.0	4.0	5.0	10.0
.10	.956	.785	.628	.523	.392	.314	.157
.50	.981	.765	.612	.510	.382	.306	.153
1.00	.987	.760	.608	.507	.380	.304	.152
1.50	.858	.874	.699	.583	.437	.350	.175
2.00	.590	.786	.983	.848	.636	.509	.254
2.50	.308	.410	.513	.615	.820	.976	.488
3.00	.120	.160	.200	.240	.320	.400	.800

I am grateful to Dr. C. R. Rao under whose guidance this note was written.

REFERENCES

BAKER, G. A. (1949) : The variance of the proportion of samples falling within a fixed interval for a normal population. *Ann. Math. Stat.*, **20**, 125-126.

RAO, C. R. (1952) : *Advanced Statistical Methods in Biometric Research*, John Wiley & Sons, New York, p. 207.

SALVOSA, L. R. (1930) : Tables of Pearsons' type III function. *Ann. Math. Stat.*, **1**, appended.

STEVENS, W. L. (1948) : Control by gauging. *J. Roy. Stat. Soc.*, Series B, **10**, 54-98.

SCALING PROCEDURES IN SCHOLASTIC AND VOCATIONAL TESTS*

By P. K. BOSE and S. B. CHOUDHURY

University of Calcutta

1. INTRODUCTION

For testing scholastic and vocational aptitude of different individuals, several kinds of tests are in existence, the commonest one being the ordinary examination system, where the different candidates are subject to written and oral examinations. According to the present system of examination candidates are examined in more than one subject generally; the scores in different subjects are added together and the candidates are ranked or scaled according to the total scores.

A critical analysis of this method of combining the scores will bring out its great drawback. The method does not take into account the differences between the distributions of scores in various subjects. Due to various reasons e.g. (a) intrinsic differences between the subjects, (b) differences in aptitude of candidates in different subjects, (c) differences in standards of examination in different subjects, (d) random fluctuations etc., the distributions of scores in different subjects are usually dissimilar. But the ordinary method of scaling according to total scores assumes that the distributions are identical, which is hardly a case in practice.

A more appropriate method of scaling which may be suggested is to find out the equivalent scores in different subjects with respect to a standard one. Converting scores in different subjects into equivalent scores in one standard subject, one may add up these equivalent scores (instead of the actual scores) to get a total score which may be used for the purpose of scaling.

The problem of scaling can thus be regarded as solved if a method can be evolved to find out the equivalent scores. In this paper an attempt has been made to give a general procedure for finding out the equivalent scores, and to apply this method for solving a practical problem. The method of calculating equivalent scores in some particular situations have been studied by Mahalanobis and Chakravarti (1934), Hussain (1941), and Greenall (1949).

2. METHOD

In setting up an equivalence between two scores, the following points should be observed : (1) the equivalence set-up should be mutual, and (ii) the set-up should be independent of scale. Bearing these two points in mind we may define equivalent scores as follows :

Two scores in two different subjects will be said to be equivalent when the percentile ranks of these two scores are identical. Let us consider two subjects X and Y, the scores being denoted by x and y respectively. Clearly in educational measurements the variate may actually range from 0 to the full marks in the subject and generally the values are integral. But the assumptions of continuity and of unlimited range from $-\infty$ to $+\infty$ will not be meaningless. (By assumption of continuity we mean that a variate value $x-$ an integer $-$ is really the middle value of the class-interval $x-0.5$ to $x+0.5$). Let the distribution functions

---

* Presented at the 41st session of the Indian Science Congress, Hyderabad, 1954.

o $\frac{.}{.}$ x and y be $dF(x) = f(x)dx$, and $d\Phi(y) = \phi(y)dy$ respectively. (We are assuming that the distributions belong to the continuous type, which is supported by experience.) The percentile ranks p and p' say of two scores x_i and y_i in the two subjects are then defined by

$$\frac{p}{100} = \int_{-\infty}^{x_i} f(x)dx = F(x_i) \; ; \frac{p'}{100} = \int_{-\infty}^{y_i} \phi(y)dy = \Phi(y_i). \qquad \ldots \; (1)$$

. two scores x_i and y_i will be said to be equivalent if

$$p = p', \; i.e. \; F(x_i) = \int_{-\infty}^{x_i} f(x)dx = \Phi(y_i) = \int_{-\infty}^{y_i} \phi(y)dy. \qquad .. \; (2)$$

Diagrammatically the method is equivalent to drawing ogives (or cumulative percentage graphs) for the two subjects on the same graph and taking two scores in the two subjects as equivalent when a straight line parallel to the horizontal axis cuts the two ogives at points whose abscissa are these two scores.

It easily follows that the different quantiles (percentiles etc.) of the x–distribution are equivalent to the corresponding quantiles of the y–distribution.

When the two distributions are normal this definition will lead to a very simple relation. Suppose that x and y are normal with means m_x and m_y, and s.d.'s σ_x and σ_y respectively. Then if two scores x_i and y_i are equivalent we must have

$$\frac{x_i - m_x}{\sigma_x} = \frac{y_i - m_y}{\sigma_y}.$$

This relation shows that two scores in two different subjects following normal distribution are equivalent when the corresponding standardised scores are equal. In this situation the x and y scores may be mutually converted by the relation

$$\frac{x - m_x}{\sigma_x} = \frac{y - m_y}{\sigma_y}. \qquad \ldots \; (3)$$

The equation (2) gives a functional relationship between the equivalent scores. Such functional relationships may be termed as "equivalence relationships" and the corresponding curve may be called the "equivalence curve". This is really the equipercentile curve, i.e., the two co-ordinates of every point on it have equal percentile ranks. If both the scores have normal distributions the functional relationship is linear and the equivalence curve may then be termed the equivalence line. Its equation is

$$y = m_y + \frac{\sigma_y}{\sigma_x} (x - m_x).$$

But in cases of non-normal variation of one or both of the distributions, such a simple functional relationship cannot be established. We may, however, approximate to it by obtaining a polynomial of appropriate degree as a satisfactory fit by taking one of x or y (whichever may be taken as the standard subject) as the independent variable and the other as dependent.

SCALING PROCEDURES IN SCHOLALTIC AND VOCATIONAL TESTS

The equivalence curve or some approximation to it is necessary for suitable conversion of scores as it avoids laborious calculation of the equivalent scores every time from the theoretical distribution.

Suppose that the distribution of x scores and y scores belong to Pearsonian types III and II respectively, that is to say, the distribution of x is given by

$$dF = c\left(1 + \frac{x}{A}\right)^p e^{-\gamma x} dx, \ (-A \leqslant x \leqslant \infty)$$

(origin at mean) and that of y is given by

$$dF = k\left(1 - \frac{y^2}{a^2}\right)^m dy, \ (-a \leqslant x \leqslant a) \ (\text{origin at mean}).$$

Two scores x_i and y_i in subjects X and Y respectively will be equivalent if

$$\int_{-A}^{x_i} C\left(1 + \frac{x}{A}\right)^p e^{-\gamma x} dx = \int_{-a}^{y_i} k\left(1 - \frac{y^2}{a^2}\right)^m dy. \qquad \ldots \ (4)$$

(We may put the lower limit equal to $-\infty$ in both the integrals).

Let the common value of the integrals in (2) be $\frac{i}{100}$. For different values of i, we may determine the quantiles (usually percentiles, or deciles) x_i and y_i for the two distributions, and thus get two sets of values of x and y, say $x_{10}, x_{20}, \ldots, x_{80}, x_{90}$ and $y_{10}, y_{20}, \ldots, y_{80}, y_{90}$ where $x_i \equiv y_i$. This gives a table of equivalent scores.

The task of approximating the exact equivalence relationship by means of some polynomial of adequate degree is lightened if in the preparation of the above preliminary table of equivalent scores the scores of the standard subject are taken as equispaced, in order to facilitate the use of orthogonal polynomials.

3. Procedures with Sample Data

Our discussion above is based on the population distribution of scores, which is not known in practice. With sample scores therefore the problem of specification has to be solved by the customary methods of graduation. We may graduate the frequency distribution of scores in the sample against the most important of the known sets of curves—the Pearsonian system. Thereafter the procedure will be exactly similar to that described above.

If we like to deal only with the sample and not to go through the process of graduation and calculation of percentiles by using tables, two courses of procedure are there: (i) drawing all the sample ogives on the same graph paper, and reading off from it the scores in the standard subject equivalent to any score in any other subject, and (ii) calculating several percentile scores for each sample distribution, plotting for each pair of subjects (one being the standard) points with corresponding percentile scores as co-ordinates in a graph, and connecting them by a free-hand curve—the equipercentile curve—which will be used to convert scores in various subjects in terms of the standard.

When the equivalence curve is set up, the raw scores of different individuals in all subjects may be converted into the scores in the standard subject. Since now all the scores are measured in the same scale we can sum them to get a valid measure by means of which the individuals may be ranked or scaled properly.

4. An example

Scores of a random sample of 500 students have been obtained from the records of a scholastic test. Each candidate has got six scores, i.e. scores in six different subjects: Vernacular, English, Classical Language, History, Geography and Mathematics, the full marks and pass marks in which were different. For ease of comparison (and not as a theoretical necessity) all the scores were transformed so as to correspond to full marks 100 in each subject. Though the subjects Vernacular and Classical Language allowed of many alternatives, no attempt was made to distinguish between different combinations possible under these broad headings. Here exists thus an element of heterogeneity.

The object of the investigation is to construct equivalence relationships in the form of equipercentile curves for the purpose of scaling.

The frequency distributions of scores in different subjects are shown in Table 1. These frequency distributions revealed one remarkable feature. In scholastic tests where pass, fail or class is important, there are very irregular frequencies, unusually high or low in borderline classes. The reason is obvious. Because there is a pass mark or a class mark in each subject, the examiner is not free from bias and as a result of this there are more cases in particular intervals (in different subjects) than in others. This is one of the factors contributing to non-normality of the distributions of scores.

It was found that the appropriate Pearsonian types for fitting the distributions of scores were : normal for Vernacular, type II for English and Geography, and type III for classical language, history and mathematics. The moment-coefficients etc., for the different distributions are shown in the Tables 2 and 3.

The percentile ranks of scores 0, 5, 10, ..., 95, 100 in Vernacular were found out and are shown in col. (2) of Table 4. The corresponding scores in other subjects i.e. those with the same percentile ranks were determined. For this purpose, the tables of Incomplete Gamma function and Incomplete Beta function were used when the distribution in the other subject was of type III and type II respectively. Thus a table of equivalent scores giving the scores in the other subjects which are equivalent to marks 0, 5, ..., 95, 100 in Vernacular is obtained. These are shown in cols. (3)—(7) of Table 4.

The approximate relationships between scores in Vernacular and the equivalent scores in the 5 other subjects were determined (separately for the 5 subjects) by fitting orthogonal polynomials. Denoting scores in Vernacular, Mathematics, Classical Language, History, English and Geography by x, y_m, y_c, y_h, y_e, y_g respectively, the equivalence relationships were obtained as :

Mathematics and Vernacular : $y_m = -17.8555 + 0.8714x + 0.0083x^2$

Classical language and
    Vernacular : $\quad y_c = 1.0514 + 0.5545x + 0.0085x^2$

History and Vernacular : $\quad y_h = -11.1393 + 0.6518x + 0.0088x^2$

English and Vernacular : $\quad y_e = -1.40088 + 0.25421x + 0.01622x^2 - 0.000097x^3$

Geography and Vernacular : $\quad y_g = 11.42080 + 0.46064x + 0.01135x^2 - 0.00008x^3$

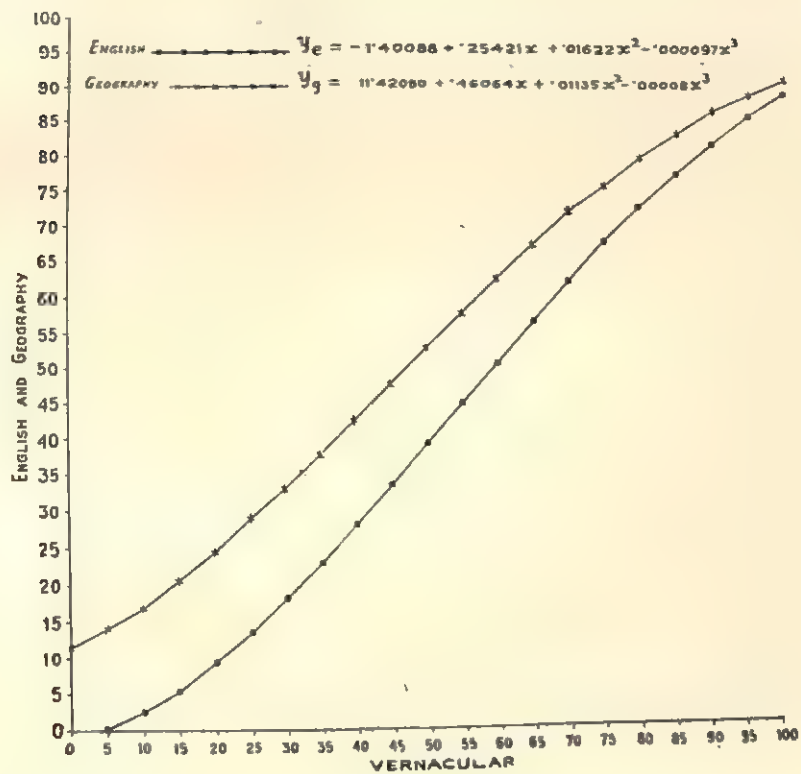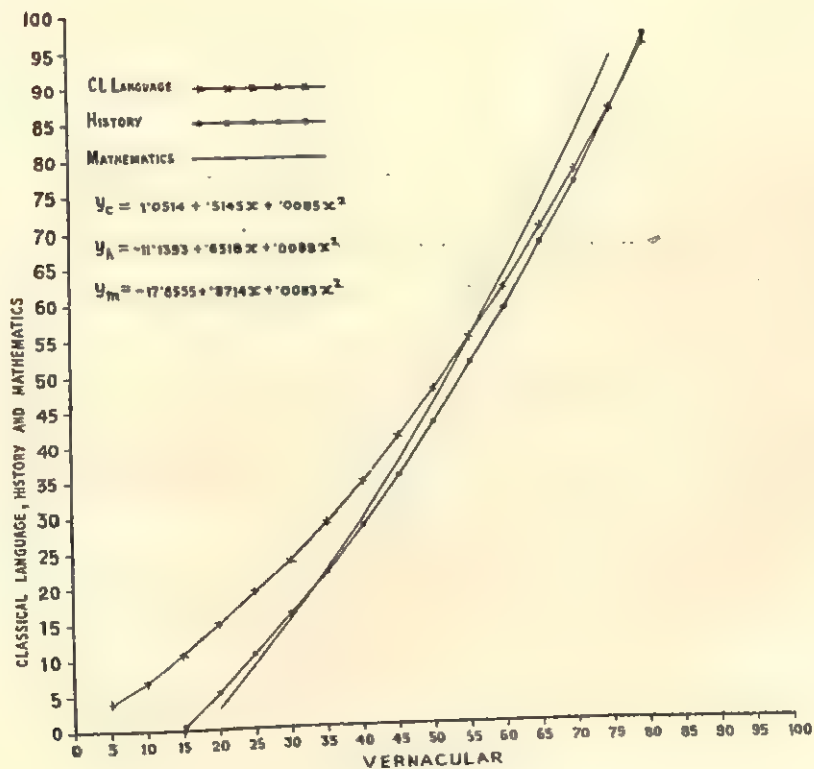$$\left. \right\} \quad \dots \quad (5)$$

Fig. 1

Fig. 2

The above relationships are shown diagrammatically in Fig. 1 and Fig. 2. The fits provided were excellent except in the cases of English and Geography. This was due to some inaccuracies in the equivalent scores for these subjects (corresponding to scores 45 and 50 in Vernacular) and could be attributed to linear interpolation in portions of Incomplete Beta Function table. Entering the table for $q = 5$ and $p = 9.5$, 10 and 10.5 it was noticed that for $z = 0.99$ the value of $I_z(p, q)$ are 0.6662641, 0.6579282 and 0.6498437 respectively and for $z = 1$, $I_z(p, q) = 1$. The table does not provide the value of I at some finer interval for the z-value in the range $0.99 < z < 1$, which is necessary in order to read the value of z for any $I_z(p, q)$ falling in the long range from nearly 0.65 to 1. For these two subjects the third degree polynomials did not give very good results, while for the others 2nd degree curves were very good.

On the basis of these relationships another set of equivalent scores was again prepared [cols. (8)-(12), Table 4]. Either the relationships themselves or the 5 equivalence curves drawn may be used for finding scores equivalent to given scores in Vernacular.

The method was applied to examine the ranking by the present system (i.e. using the total of raw scores) of the 15 top-ranking candidates i.e. those securing highest total ordinary scores in the sample. All scores were converted to equivalent scores in Vernacular; these converted scores were added and used for scaling the same candidates (Table 5). The two scales are given as follows :

Old ranking :—1, 2, 3, 4, 4, 6, 7, 8, 8, 10, 10, 10, 13, 14, 14.

New ranking :—3, 2, 1, 4, 5, 7, 6, 14, 7, 10, 11, 9, 12, 12, 15.

A comparison of the old ranking and this new ranking is illuminating. It is a pointer to the fact that we err seriously by the old method.

REFERENCES

GREENALL, P. D. (1949) : The concept of equivalent scores in similar tests. *British Journal of Psychology*, Statistical Section, 2, 30-40.

HUSSAIN, Q. M. (1941) : Standardisation of examination marks. *Sankhyā*, 5, 295-300.

MAHALANOBIS, P. C. and CHAKRAVARTI, K. N. (1934) : Studies in educational tests No. 3., *Sankhyā*, 1, 245-266.

TABLE 1.   FREQUENCY DISTRIBUTIONS OF SCORES IN SIX SUBJECTS
OBTAINED BY 500 STUDENTS

score	frequency					
	Vernacular	English	Classical Language	History	Geography	Mathematics
0— 4		3		4	1	9
5— 9		6	2	9	0	8
10—14		12	7	12	4	18
15—19	6	23	9	29	7	13
20—24	7	35	12	28	12	32
25—29	18	45	8	15	2	4
30—34	34	74	80	118	69	101
35—39	56	72	79	58	45	58
40—44	84	78	73	52	53	51
45—49	74	53	62	40	60	46
50—54	104	46	55	42	61	42
55—59	53	29	33	26	36	31
60—64	36	18	21	25	48	21
65—69	16	5	19	13	32	14
70—74	9	1	20	9	44	19
75—79	0		8	5	18	16
80—84	3		9	14	6	6
85—89			2	1	2	5
90—94			1			4
95—99						2
total	500	500	500	500	500	500

TABLE 2.   MOMENTS, β_1 AND β_2 FOR THE DISTRIBUTIONS OF SCORES IN 6 SUBJECTS

subjects	Vernacular	Mathematics	Classical Language	History	English	Geography
mean	47.07	42.57	45.14	40.14	38.87	49.94
variance *	5.121804	14.045004	8.761616	11.221616	6.863724	9.722256
μ_3 *	— 0.405118	17.989128	11.677442	15.190802	— 2.394132	— 1.597358
μ_4 *	82.658661	600.247617	250.894082	387.099413	128.824563	259.552977
β_1	0.001222	0.116803	0.202740	0.163304	0.017726	0.002776
β_2	3.150959	3.042890	3.268299	3.074060	2.734510	2.745940

* (Class–interval)², (Class–interval)³ and (Class–interval)⁴ being the units of measurements for Variances, μ_3 and μ_4 respectively.

TABLE 3.   PEARSONIAN CURVES FITTING THE SIX FREQUENCY DISTRIBUTIONS

subject	type	equation*	values of parameters		
Vernacular	normal	$\dfrac{1}{\sigma\sqrt{2\pi}}\, e^{-\frac{x^2}{2\sigma^2}}$ $-\infty \leqslant x \leqslant \infty$	mean=47.07		$\sigma = 11.315920$
English Geography	II	$y_0\left(1-\dfrac{x^2}{a^2}\right)^m$ $-a \leqslant x \leqslant +a$	mean=38.87 mean=49.94	m=8.799861 m=9.308234	a²=3534.765900 a²=2627.010550
Classical Language History Mathematics	III	$y_0\left(1+\dfrac{x}{A}\right)^p e^{-\gamma x}$ $-A \leqslant x \leqslant \infty$	mean=45.14 γ=0.300121 mean=40.14 γ=0.295484 mean=42.57 γ=0.312296	p=18.729703 A=65.739162 p=23.494195 A=82.895165 p=33.188034, A=109.473173	

*origin at mean

TABLE 4. EQUIVALENT SCORES BASED ON EQUATION 2 AND ON REGRESSION EQUATIONS 5

Vernacular	percentile rank	equivalent scores (equation 2)					equivalent scores (equations 5)				
		Classical Language	History	Mathematics	English	Geography	Classical Language	History	Mathematics	English	Geography
0	0.00159					10.88	1				11
5	0.01	3.55				13.82	4			0	14
10	0.05	6.90				16.88	7			3	17
15	0.23	10.83	0.46		3.04	20.54	11	1		6	21
20	0.84	15.00	5.40	2.83	7.63	24.44	15	5	3	9	25
25	2.56	19.49	10.73	9.11	12.60	28.67	19	11	9	14	29
30	6.57	24.24	16.41	15.79	17.94	33.17	24	16	16	18	33
35	14.31	29.63	22.54	22.86	23.56	37.90	29	22	23	23	38
40	26.61	34.64	29.07	30.30	29.40	42.81	35	29	30	29	43
45	42.74	41.39	36.01	38.15	33.98	46.62	41	36	38	34	48
50	60.21	47.90	43.40	46.42	42.49	53.87	48	43	46	40	53
55	73.83	54.86	51.23	55.11	47.41	57.96	55	51	55	46	58
60	87.34	62.26	59.51	64.21	53.17	62.80	63	60	64	51	63
65	94.35	70.14	68.27	73.78	58.75	67.51	70	68	74	57	67
70	97.86	78.44	77.47	83.77	64.01	71.96	79	78	84	63	72
75	99.32	87.26	87.19	94.18	68.93	76.14	87	87	94	68	76
80	99.82	96.59	97.41		73.42	79.97	97	97		73	80
85	99.96				77.52	83.47				78	83
90	99.99				80.53	86.06				82	86
95	99.99886				84.25	89.44				86	89
100	99.99985				86.83	91.70				89	91

TABLE 5.   ORIGINAL AND EQUIVALENT SCORES AND RANK OF STUDENTS SECURING HIGHEST TOTAL ORDINARY SCORES FROM THE SAMPLE OF 500.

students	actual score							
	Vernacular	Classical Language	History	Mathematics	English	Geography	total	rank
1	71	90	71	85	71	64	452	1
2	71	70	78	92	62	78	451	2
3	73	62	71	75	67	86	434	3
4	64	68	80	77	67	72	428	4
5	64	74	80	83	59	68	428	4
6	84	81	84	73	59	38	419	6
7	63	65	54	97	56	80	415	7
8	58	60	83	88	56	62	407	8
9	66	71	55	84	57	74	407	8
10	62	81	55	72	62	70	402	10
11	60	80	48	80	62	72	402	10
12	62	58	58	82	68	74	402	10
13	64	76	60	61	62	70	393	13
14	67	58	64	58	67	74	388	14
15	61	71	44	80	62	70	388	14

	equivalent scores (Vernacular equivalent)							
1	71	77	67	71	78	61	425	3
2	71	65	70	74	70	78	428	2
3	73	60	67	66	74	90	430	1
4	64	64	72	67	74	70	411	4
5	64	68	72	70	67	66	407	5
6	84	72	74	65	67	35	397	7
7	63	62	57	76	64	80	402	6
8	58	58	73	72	64	59	384	14
9	66	65	58	70	65	73	397	7
10	62	72	58	64	70	68	394	10
11	60	71	58	67	70	70	391	11
12	62	57	59	69	75	73	395	9
13	64	69	60	59	70	68	390	12
14	67	57	63	56	74	73	390	12
15	61	65	50	67	70	68	381	15

ON THE EVALUATION OF GROSS VALUE IN AGRICULTURE BY MAKING USE OF DISTRICTWISE PRICE DATA AND THE STATE OUTTURN

By M. MUKHERJEE

Central Statistical Organization, New Delhi

1.   Usually it happens that at the time of estimation of the gross value in agriculture, districtwise price data are available, but the outturn is available for the State as a whole. The purpose of this paper is to find out theoretically an appropriate price average for the evaluation of the State outturn in this case and then to test the theoretical findings with the districtwise data on both production and prices available in respect of past period for a number of States.   The work is important because agriculture contributes roughly half of the national income in India, and even a small addition to accuracy in the estimation of gross value in this sector would materially reduce the overall error of our national income estimate.

2.   The problem may be posed as follows.   Consider a State with n districts.   The prices (p_i) in n districts are known.   The production figures (w_i) are not known, but $\sum_{i=1}^{n} w_i = W$ is known. $\Sigma w_i p_i$ gives theoretically the most satisfactory estimate of the gross value.   The problem is to estimate $\xi = f(p_i)$, such that $W\xi$ is in some sense the best possible estimate for $\Sigma w_i p_i$.

3.   Let

$$\sigma_w^2 = \frac{\sum_{i=1}^{n} (w_i - \bar{w})^2}{n}, \quad \bar{w} = \frac{\sum_{i=1}^{n} w_i}{n} = \frac{W}{n},$$

$$\sigma_p^2 = \frac{\sum_{i=1}^{n} (p_i - \bar{p})^2}{n}, \quad \bar{p} = \frac{\sum_{i=1}^{n} p_i}{n},$$

$$r_{wp} = \frac{\sum_{i=1}^{n} (w_i - \bar{w})(p_i - \bar{p})}{n \sigma_w \sigma_p} = \frac{\sum_{i=1}^{n} w_i p_i - n \bar{w} \bar{p}}{n \sigma_w \sigma_p} = \frac{\Sigma w_i p_i - W \bar{p}}{n \sigma_w \sigma_p}.$$

4.   If follows from paragraph 3, that if on *a priori* grounds r_{wp} can be assumed to be zero, then, $\Sigma w_i p_i$ is estimated best when $\xi = \bar{p}$. When ξ equals the median, and there is no reason to believe that the distribution of p's is skew, the median will be an equally good estimator.   If, however, p's have a distribution with positive skewness, the median will be under-estimating; but if the skewness is negative, the median will be over-estimating.   In either case, mean will be a better estimator than the median.   In 21 cases studied by us, the mean is greater than the median in 15 cases (see Table 1).   Thus it is likely that positive skewness exists in a larger number of cases.   If this is so, then on the assumption of zero correlation, mean becomes a better estimator than median.

5.   On *a priori* grounds, some negative correlation may, however, be expected between production and prices.   Where there is surplus production, prices are likely to be low. It may be reasonably supposed that districts with larger production have on an average a greater chance of being surplus than districts with smaller production.   Quite possibly some

207

district with small production will be surplus, but still the above supposition may generally hold. Under this supposition there will be a negative correlation between production and prices. In our study, in 15 cases out of 21, we have found negative correlation, lending support to the above contention (see Table 1).

6.   Now if $r_{wp} < 0$, and no hypothesis is made as regards skewness of p's, it follows from paragraph 3 that $\bar{p}$ will be over-estimating. In this case the geometric (or harmonic) mean may be a better estimator than $\bar{p}$.

7.   The available evidence however leads to the hypothesis that both $r_{wp} < 0$ and skewness is positive. In this case since the median $< \bar{p}$, it is likely to be a better estimator than the mean.

8.   Let us call $\Sigma w_i p_i / W = \mu$ and geometric (or harmonic) mean m_g. In the case discussed in paragraphs 6 and 7, the geometric mean (or harmonic mean) will be better estimators only if the excess of $\bar{p}$ over μ is greater than the excess of μ over m_g, when μ is greater than m_g.

9.   A detailed study of the above problem has been made in respect of the median m. By our hypothesis, $\bar{p} > m$, and $\bar{p} > \mu$ since $r_{wp} < 0$. Now if $m > \mu$, it will be a better estimator than the mean. If $m < \mu$, but $\mu - m < \bar{p} - \mu$, then also median will be better. When $\mu - m = \bar{p} - \mu$, $\bar{p}$ and m will be equally good. But when $\mu - m > \bar{p} - \mu$, mean will be a better estimator than the median.

10.   However, since

$$\frac{\mu - m}{\mu - \bar{p}} = 1 + \frac{\bar{w}}{\sigma_w} \cdot \frac{\bar{p} - m}{\sigma_p} \cdot \frac{1}{r_{wp}} \, ,$$

the magnitude of under-estimation by the use of median will be less than the magnitude of over-estimation by the use of mean so long as $\dfrac{\bar{w}}{\sigma_w} \cdot \dfrac{\bar{p} - m}{\sigma_p} \cdot \dfrac{1}{\gamma_{wp}}$ is numerically less than 2. As districtwise production figures are expected to show a large coefficient of variation, and $\dfrac{\bar{p} - m}{\sigma_p}$ is necessarily a very small quantity, the above expression can exceed 2 only when r_{wp} is very small, but this case is precluded by the hypothesis of real negative correlation. Hence, the case outlined at the end of paragraph 9 has a very small chance of occurrence for the type of data we are dealing with and we may conclude that when $r_{wp} < 0$ and skewness is positive (i.e., in the normal case in respect of the data we are using), median is a better estimator than the mean. This is corroborated by a larger study of 83 cases for which median gives an overall under-estimation of 0.6 p.c. while mean gives an overall over-estimation of 1.5 p.c.

11.   If we go back to the position of paragraph 6, and remove the assumption of positive skewness, since considerations in paragraph 10 show that the magnitude of over-estimation by the use of mean is likely to be greater than the magnitude of under-estimation by the use of median, when μ lies in the range $(\bar{p}, m)$, it follows that when $\bar{p} > m$, m is a better estimator than $\bar{p}$. If, however, $m > \bar{p}$, μ being obviously less than $\bar{p}$, $\bar{p}$ is a better estimator than m in this case. Thus, we arrive at the interesting rule that when $r_{wp} < 0$ and no assumption is made regarding skewness, the smaller of the mean and median is the better estimator. The rule is useful because this can be followed in practice.

12. For positive correlation, on the other hand, it can be easily shown that the larger of the mean and median is the better estimator.

13. The experimental results are presented in Table 1 below. It will be seen that the rules given in paragraphs 11 and 12 have been violated only once (in the case of Hyderabad, Jowar). In this case values of $\dfrac{\bar{w}}{\sigma_w}$ and $\dfrac{\bar{p}-m}{\sigma_p}$ are both found to be unexpectedly large, and the result is more due to this than due to the smallness of the correlation coefficient.

TABLE 1. PRICE AVERAGES AND CORRELATIONS BETWEEN PRICE AND PRODUCTION

crop	state	year	no. of districts	weighted mean	mean	median	r_{wp}
winter rice	Bihar	1947–48	15	18.3900	18.2300	16.0000	+0.0557
autumn rice	,,	,,	15	14.5000	16.7000	15.0000	−0.2520
wheat	,,	,,	13	22.0400	21.9000	22.0000	+0.0207
barley	,,	,,	11	12.1000	12.9000	12.8000	−0.3400
gram	,,	,,	15	14.0989	15.1000	13.1000	−0.1962
gur	,,	,,	15	14.6000	16.6000	16.0000	−0.3864
Indian corn	,,	,,	12	10.2000	10.4000	10.0000	−0.1130
rice	U.P.	1945–46	31	17.7000	18.4000	17.8000	−0.2170
,,	,,	1946–47	38	17.7800	17.6600	17.7500	+0.0580
,,	,,	1947–48	43	19.8000	19.2500	17.7500	+0.2170
,,	,,	1948–49	43	26.2000	26.6000	26.7000	−0.1280
wheat	East Punjab	1948–49	12	14.4000	14.6200	14.3000	−0.5000
gram	,, ,,	,,	12	8.5000	8.6500	8.5000	−0.2980
groundnut	Hyderabad	,,	14	62.7000	61.3000	62.0000	+0.3690
jowar	,,	,,	12	39.5000	40.5000	33.5000	−0.1340
rice	Bombay	,,	18	0.6800	0.7700	0.7400	−0.2988
wheat	,,	,,	14	0.6900	0.5640	0.4750	+0.3739
gram	,,	,,	18	0.4800	0.5590	0.5350	−0.5959
gur	,,	,,	18	0.6400	0.6530	0.6800	−0.1112
bajra	,,	,,	14	0.3900	0.4240	0.4000	−0.0912
jowar	,,	,,	16	0.3800	0.3956	0.3650	−0.1610

27

A POSSIBLE USE OF CERTAIN MEASUREMENTS IN
CONTROL BY GAUGING

By B. C. BHATTACHARYYA*

Indian Statistical Institute, Calcutta

1. Of Shewhart's quality control charts, the p-chart is specially convenient on account of the simplicity with which the requisite observations can be made. Depending on whether the tolerances specify a superior limit, an inferior limit, or both, to the measure of the characteristic concerned, a single "go" gauge or "no go" gauge or the two together will serve the purpose. In the sequel, we shall be concerned with the last case; it will be comparatively simple to work out our suggestions with regard to the first two cases.

The population of measures of the characteristic will be assumed to be normal. If the sample sizes are constant, say n, points representing the number of "defectives" in samples of n falling beyond the control limits at $np \pm 3\sqrt{np\bar{q}}$ (p being the probability of a defective under controlled conditions) indicate lack of control.

One drawback of the ordinary p-chart is that an out-of-control point does not indicate whether the population mean or the population standard deviation (s.d.) has altered. Usually, a change in the mean points to the need of resetting the machine, while a change in the s.d. points to a change of process, which may mean a change of the operator, or the material, or the condition of temperature etc., or a change of machine characteristics. It is therefore necessary to distinguish between the two types of changes.

Among attempts directed to overcome this drawback is an elaborate paper by Stevens (1948), where it was suggested that one "go" gauge and another "no go" gauge (not necessarily adjusted to the tolerance limits of manufacture, but suited solely to purposes of control) should be used. If c and a be the numbers of articles which fail the two gauges respectively in a sample of n, then Stevens recommends $c - a$ as an 'indicator' of change of the population mean and $c + a$ that of a change of the population s.d.

Here it is desired to examine how measurements, instead of mere enumeration of the two categories of "defectives", defined by the "go" gauge and "no go" gauges respectively, could be used for the purpose of distinguishing between the two types of changes.

2. In practice, the p-chart is always preceded by $\bar{X}$ and R charts for a duration until controlled condition is attained. We shall therefore assume that the mean μ and the s.d. σ of the (normal) population have been satisfactorily estimated. Without loss of generality, we may take the mean as zero.

Simplifying the problem further, pending a more complete treatment in future, we shall suppose that the gauges are adjusted to the two quartiles. These quartiles divide the

---

population into three sections which we designate as A, B and C. The notations used are defined as follows :

a, b, c = numbers of observations in a sample of n falling in the sections A, B, C respectively,

x_1 = semi-inter-quartile range,

$z_C = x - x_1$, for $x > x_1$,

$z_A = x + x_1$, for $x < -x_1$,

$$\mu'_{1C} = \int_{x_1}^{\infty} x \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx \Big/ \int_{x_1}^{\infty} \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx = \frac{4\sigma}{\sqrt{2\pi}} e^{-\frac{x_1^2}{2\sigma^2}} = \sigma D \text{ say,}$$

$$\mu'_{1A} = \int_{-\infty}^{-x_1} x \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx \Big/ \int_{-\infty}^{-x_1} \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx = -\sigma D,$$

$$\mu'_{2A} = \mu'_{2C} = \int_{x_1}^{\infty} x^2 \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx \Big/ \int_{x_1}^{\infty} \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}} dx$$

= the value when the integrals are taken between the limits $-\infty$ and $-x_1$

$$= 2\sigma^2 \left[1 - \frac{2}{\sqrt{\pi}} \int_0^{x_1^2/2\sigma^2} t^{\frac{1}{2}} e^{-t} dt \right] = \sigma^2 F \text{ say.}$$

The value of F can be found by a reference to the Incomplete Γ-Function Tables.

3. Let us first consider changes in the population mean. The essential point in Stevens' indicator $c-a$ is that each observation is given the same weight. We shall construct a similar "indicator" by giving different weights, namely $|z_C|$ or $|z_A|$ according as the observation falls in section C or A. This new indicator X corresponding to Stevens' $c-a$, is then given by

$$X = \sum_C |z_C| - \sum_A |z_A| = \sum_C x + \sum_A x - (c-a)x_1$$

since z_A's are negative and z_C's positive.

It is likely that X, based on actual measures, will yield better results than Stevens' indicator $c-a$, but a comparison of the 'powers' of the two will not be undertaken.

In calculating the mean and variance of X we utilise the fact that the random variables x are independent of the random variables c and a, since a measure x, falling in the section C say, does not depend on the total number c of them falling in C. Further, x's are independent of one another. We therefore have

$$E(X) = E(c)\mu'_{1C} + E(a)\mu'_{1A} - x_1 E(c-a)$$
$$= (\mu'_{1C} - x_1)E[(c-a)].$$

If the probabilities of x falling in the sections A, B, C be p, q, r respectively $(p+q+r = 1)$,

$$E(c-a) = n(r-p), \text{ and Var } (c-a) = n[(p+r)-(p-r)^2].$$

In our case $p = r = \frac{1}{4}$, and hence $E(X) = 0$.

The variance of X is given by

$$V(X) = \sigma_X^2 = E\left[\sum_C x + \sum_A x - (c-a)x_1 \right]^2$$

$$= E\left[\sum_C x^2 + \sum_{\substack{C \\ i \neq j}} x_i x_j + \sum_A x^2 + \sum_{\substack{A \\ i \neq j}} x_i x_j + (c-a)^2 x_1^2 - \right.$$

$$\left. - 2x_1(c-a) \sum_C x - 2x_1(c-a) \sum_A x + 2 \sum_C x_C \sum_A x_A \right]$$

$$= \frac{n}{2} \mu'_{2C} + \frac{n}{2} \left(\mu'_{1C} - x_1 \right)^2 - \frac{n}{2} \mu'^2_{1C}$$

$$= n\sigma^2 G$$

where $G = \frac{1}{2}\left[F + \frac{x_1^2}{\sigma^2} - \frac{2x_1}{\sigma} D \right]$, a constant independent of n and σ.

4. Similarly, corresponding to Stevens' indicator $c+a$ for the purpose of detecting changes in the population s.d., we may frame another indicator Y as follows :

$$Y = \sum_C |z_C| + \sum_A |z_A| = \sum_C x - \sum_A x - (c+a)x_1.$$

Y is thus the sum of the deviations from the mean. The mean deviation is a recognized measure for the spread of a population and Y differs from it in being the sum instead of the mean. Stevens' indicator $c+a$ is none other than the proportion defective of the ordinary chart where the defectives are marked off by the two gauge-limits. Looked from this point of view, an out-of-control point on a $(c+a)$-chart may not be so indicative of a change of population s.d. as Y is.

Proceeding exactly as before

$$E(Y) = \frac{n}{2}(\mu'_{1C} - x_1) = \frac{n\sigma}{2}\left(D - \frac{x_1}{\sigma} \right) = n\sigma H \text{ say.}$$

$$E(Y^2) = E(c)\mu'_{2C} + E\{c(c-1)\}\mu'^2_{1C} + E(a)\mu'_{2A}$$
$$+ E\{a(a-1)\}\mu'^2_{1A} + x_1^2 E(c+a)^2 - 2x_1\mu'_{1C}E(c+a)^2 + 2\mu'^2_{1C}E(ca).$$

$$= \frac{n}{2}\mu'_{2C} + (\mu'_{1C} - x_1)^2\left(\frac{x}{4} + \frac{x^2}{4}\right) - \frac{n}{2}\mu^2_{1C}.$$

Therefore, $\text{Var}(Y) = \sigma_Y^2 = \frac{n}{2}\left[\sigma^2 F - \sigma^2 D^2 + \frac{1}{2}(\sigma D - x_1)^2 \right] = n\sigma^2 K$ say.

5. It should be noted that the quantities D, F, G, H and K are all independent of n and σ, while σ_X, $E(Y)$ and σ_Y have variable factors depending on n and σ. Suitable tables for σ_X, $E(Y)$ and σ_Y can therefore be prepared for selected values of n and σ.

USE OF CERTAIN MEASUREMENTS IN CONTROL BY GAUGING

From the point of view of practical applications, it is unnecessary to maintain a chart for X or Y. We may prepare tables of values of $3\sigma_X$ and $3\sigma_Y$ for selected values of n and σ, and calculate $|X|$ and $|Y-E(Y)|$ *only when a point falls outside the control limits of the ordinary p-chart* i.e. the $(c+a)$-chart, which is kept as a matter of routine. The value of p for such a chart corresponding to the adjustment of the gauges to quartiles is obviously $\frac{1}{2}$ and thus the control limits are $\frac{n}{2} \pm \frac{3}{2}\sqrt{n}$.

If $|X|$ exceeds the limit $3\sigma_X$ given in the tables, we conclude that the population mean has shifted towards the positive or negative direction according as X is positive or negative. The computation of Y may be avoided altogether if we can assume that whenever X is significant, *only* the population mean has changed, and when X is not significant the population s.d. has changed.

The author hopes to undertake a more complete study of the problem in future.

REFERENCE

STEVENS, W. L. (1948) : Control by gauging. *J. Roy. Stat. Soc.*, **10**, 54-108.

A NOTE ON SOME PHYSICAL MEASUREMENTS OF THE STUDENTS OF THE SENIOR-INTERMEDIATE CLASS OF THE ANNAMALAI UNIVERSITY IN THE YEAR 1947-48

By G. SANKARANARAYANAN

Annamalai University, Annamalainagar

This note gives certain physical measurements of 188 students of the Senior Intermediate class of 1947-48 of the Annamalai University. The students belonged mostly to middle class families which could be classified roughly into five groups of economic status, the respective students in each group being rich-5, comfortable-53, average-90, below average-23, very poor-17. More than 95 per cent of the students came from Tanjore and South Arcot districts in Madras, and about 90 per cent belonged to the Hindu community.

The following physical measurements were taken :

(1) *Age :* Complete number of years attained at the time of physical examination.

(2) *Weight :* Recorded to the nearest pound on weighing machine of the usual type.

(3) *Height :* Recorded to one-tenth of an inch without foot-wear or head-dress.

(4) *Vital capacity :* Recorded in cubic centimeters by an instrument which measures the volume of air exhaled.

The following Tables 1 to 6 give the two-way distributions between the different characters. The calculated values of averages, standard deviations, coefficients of correlation and regression constants are given in Table 7.

TABLE 1. RELATION BETWEEN AGE (IN YEARS) AND WEIGHT (IN LBS.)

age \ weight	79.5	89.5	99.5	109.5	119.5	129.5	139.5	149.5	total
16	1		4	2		1			8
17	2	7	17	9	2	1			38
18	1	6	14	21	4	2	1		49
19		7	13	6	6	3	2	1	38
20	1	4	5	8	8	2	1		29
21	1		4	3	2	2			12
22		1	1	4	1	1	2		10
23			1	1		1			3
24				1					1
Total	6	25	59	55	23	13	6	1	188

214

TABLE 2. RELATION BETWEEN AGE (IN YEARS) AND HEIGHT (IN INCHES)

age \ height	58	59	60	61	62	63	64	65	66	67	68	69	70	total
16				1		1	4		2					8
17	1	1			5	6	6	5	4	6	3	1		38
18	1		1		2	4	11	7	10	8	4		1	49
19				2	2	5	7	8	7	2	3	1	1	28
20			1	2	1	2	6	3	6	4	2	2		29
21						5	2	2	1		1		1	12
22					1	1	3	1	1	1	1		1	10
23						1	1		1					3
24										1				1
total	2	1	2	5	11	25	40	26	32	22	14	4	4	188

TABLE 3. RELATION BETWEEN AGE (IN YEARS) AND VITAL CAPACITY (IN C.C.)

age \ vital capacity	80-94	95-109	110-124	125-139	140-154	155-169	170-184	185-199	200-214	215-229	230-244	total
16			1	1	2	4						8
17	1	1	6	6	10	5	4	3	2			38
18	1	1	3	4	17	7	8	5	2	1		49
19		1	3	4	10	5	7	4	2		2	38
20		1	2	3	2	6	6	3	2	1	3	29
21				3	3	2	2	1		1		12
22				1	3	3		1	1	1		10
23					1		1		1			3
24						1						1
total	2	4	15	22	48	33	28	17	10	4	5	188

TABLE 4. RELATION BETWEEN WEIGHT (IN LBS.) AND HEIGHT (IN INCHES)

weight \ height	58	59	60	61	62	63	64	65	66	67	68	69	70	total
79.5	1	1	1	1		2								6
89.5			1	3	5	3	7	5		1				25
99.5	1			1	3	13	17	6	9	6	2	1		59
109.5					3	6	11	10	12	7	4	1	1	55
119.5			)			1		4	7	6	4	1		23
129.5							3	1	3	1	3		2	13
139.5							2	.	1	1		1	1	6
149.5											1			1
total	2	1	2	5	11	25	40	26	32	22	14	4	4	188

TABLE 5. RELATION BETWEEN WEIGHT (IN LBS.) AND VITAL CAPACITY (IN C.C.)

weight \ vital capacity	80-94	95-109	110-124	125-139	140-154	155-169	170-184	185-199	200-214	215-229	230-244	total
79.5		1		5								6
89.5	1	2	6	4	10	2						25
99.5			7	6	22	14	3	7				59
109.5	1	1	2	7	8	10	16	6	4			55
119.5					5	4	6	1	3	2	2	23
129.5					2	3	2	2	3	1		13
139.5					1		1	1		1	2	6
149.5											1	1
total	2	4	15	22	48	33	28	17	10	4	5	188

A NOTE ON SOME PHYSICAL MEASUREMENTS OF STUDENTS

TABLE 6. RELATION BETWEEN HEIGHT (IN INCHES) AND VITAL CAPACITY (IN C.C.)

height \ vital capacity	80-94	95-109	110-124	125-139	140-154	155-169	170-184	185-199	200-214	215-229	230-244	total
58		1	1									2
59				1								1
60				1		1						2
61		1		3	1							5
62		1	4	1	4	1						11
63			2	5	9	5	3	1				25
64	1	1	4	4	11	8	7	2	2			40
65			2	3	10	4	3	2	2			26
66				2	6	8	7	5	2	1	1	32
67	1		1	2	4	4	4	3	1	1	1	22
68				3	2	3	3	2			1	14
69			1				1				2	4
70								1	1	2		4
total	2	4	15	22	48	33	28	17	10	4	5	188

TABLE 7. VALUES OF AVERAGES, STANDARD DEVIATIONS, COEFFICIENTS OF CORRELATION AND COEFFICIENTS OF REGRESSION

serial no.	character	unit	average	standard deviation	coefficient of correlation	regression coefficient
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	age	year	18.74*	1.63	$r_{12}=0.25$, $r_{13}=0.08$, $r_{14}=0.22$.	$b_{12}=0.02$, $b_{13}=0.059$, $b_{14}=0.012$.
2	weight	lb.	106.52	13.50	$r_{23}=0.55$, $r_{24}=0.59$	$b_{21}=2.07$, $b_{23}=3.37$. $b_{21}=0.27$.
3	height	inch	64.90	2.20	$r_{34}=0.51$	$b_{31}=0.11$, $b_{32}=0.089$, $b_{34}=0.037$.
4	vital capacity	c.c.	159.60	30.06		$b_{41}=4.06$, $b_{42}=1.32$, $b_{43}=6.97$.

* The average age is actually 19.24 years since age is given in complete number of years attained.

It will be seen that among the four variables one, viz., age (in years) is not correlated highly with the others. This is due to the fact that the population studied is that of college students who are past the age of rapid growth.

Partial correlations have not been shown since they are very difficult to interpret.

. 28

A SUGGESTION TO MAKE STATISTICS A COMPLETE SITTING JOB

By F. SCHAFER

Census and Statistics Department, Wellington

Editorial Note : We received a communication from the author long ago, and we are publishing a summary of his views because his proposals deserve serious consideration.

Production of statistics is highly mechanised. This applies not only to calculating machines such as adding machines, but also to sorters, tabulators etc., employed for working out census, trade, insurance and other statistics. Indeed the monotonous noise of this electrically driven machinery, the tools and spare parts for such machines lying round in the premises give them the feature of a factory. This picture is particularly displayed by the employees. Standing or walking round the machines attended by them they offer the typical spectacle of factory workers : sitting is denied to them while they work. They have to do their job standing.

For years experts have pointed out the disadvantages and even dangers of standing jobs. Lack of sitting facilities during the work is bound to increase fatigue, and hence susceptibility to errors and even accidents, apart from the danger to general health because of feet and other diseases.

Now there is little doubt that apart from the human aspect of improved working conditions statistical productivity could be increased, if the standing jobs of preparing statistics could be changed into sitting ones. An article on "Factory Seating" published in 1950* deals with the question whether it is possible to construct tabulators, sorters etc., with sitting facilities.

It is regrettable that this aspect of improving statistics has found only scant attention among statisticians, while for decades they have attempted to improve the methods of statistical recording.

The argument that machinery with sitting facilities would be too expensive should not be an obstacle to its installation. For equipment of this kind is used mostly by larger firms and statistical offices as well as by other authorities backed up by public finance, which can afford higher cost.

However, it seems that first of all a survey of the circumstances prevailing would be needed. This would mean an investigation, whether machinery with sitting facilities is already in use, whether it can be produced and at what cost, etc. The most suitable people to answer such questions from the producers' aspect would be the comparatively few firms engaged in manufacturing statistical machinery. From the aspect of the consumers the different statistical offices would be in a good position to give information. Comprehensive and yet simple questionnaires would have to be drawn up. It would be a worthy task for a statistical society to send out such questionnaires and to draw attention in this manner towards a realm which has been neglected by the statisticians.

INDIAN STATISTICAL INSTITUTE

The Indian Statistical Institute is a Society registered under the Indian Societies Registration Act (Act No XXI of 1860).

Extracts from the Memorandum of Association

II.　*The objects of the Society shall be:—*

(1)　*To promote the study of Statistics both pure and applied and allied subjects.*

(2)　*To provide for research and instruction for the advancement of the study and dissemination of knowledge of Statistics and allied subjects.*

IV.　*The membership of the Institute and its constituent bodies shall be open to all persons irrespective of sex, nationality, race, creed or class.*

V.　*The Institute shall not distribute any part of its income or profit as dividend, gift, or bonus or in any other way among its members, provided nevertheless that office-bearers, workers and other employees shall not be debarred from receiving remuneration or participating in grants because of their also being members of the Institute.*

The Institute consists of Student Members, Sessional Members, Ordinary and Life Members, Fellows, Honorary Members and Patrons. The supreme control including the power of making rules is vested in the members in General Meeting assembled. The Chairman and other office-bearers are elected annually. The management of the affairs of the Institute is in the hands of a Council elected annually by the members of the Institute.

Membership Fee, Rs. 20/- (foreign Rs. 25/-) per year includes subscription to *Sankhyā : The Indian Journal of Statistics.*

Detailed information and Membership forms may be obtained on application to the *Indian Statistical Institute*, 203 Barrackpore Trunk Road, Calcutta-35.

It is a condition of publication in *Sankhyā* that the paper shall not already have been published elsewhere and will not be reprinted without leave of the Editor. Manuscripts should be written on one side of paper and should be preferably typewritten. It is necessary that the raw data or measurements on which the paper is based, and detailed information of their sources, should be furnished in every case. It is desirable that the distribution or correlation charts from which statistical constants are calculated should accompany the paper. Tables should be numbered consecutively with Arabic figures without brackets (e.g. Table 1, Table 45 etc.) and should have short explanatory headings. Diagrams and drawings should also be numbered consecutively with Arabic figures and should be sent in a finished state suitable for direct reproduction with all lettering in pencil. References to tables and diagrams should be given within brackets in the text. The list of literature cited should be arranged alphabetically according to authors' names. In the case of journals the volume, number, year and page references, and in the case of printed books the name of the author and the publisher, the date of publication, and number of the edition or impression should always be stated clearly. Abbreviations, local names, vernacular measures, etc., should be written very legibly (preferably in block letters) and should be explained where they first occur in the text.

Contributors receive 25 copies (joint authors: 15 copies each) of their papers free. The cost of additional reprints will depend upon the number required; for 50 additional copies the rate is Rs. 12/- for each sheet of eight pages or Rs. 2/- per page or part of a sheet, with an extra charge for plates printed on special paper. Additional copies should be ordered at the time of returning the final proof.

Publication of papers, notes, reviews, discussions, etc. does not signify the Editor's approval of the arguments used or conclusions drawn by the authors. It is to be distinctly understood that all opinions expressed are purely individual and no responsibility for such opinions rests on the Editor, the Journal Committee or the Indian Statistical Institute.